V. Plan Implementation

Implementation of the HCP is governed by an agreement among DNR, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. (See the Implementation Agreement.) The Implementation Agreement defines the roles and responsibilities of these parties regarding implementation of the HCP. The HCP and the Implementation Agreement are supplementary to each other. Together, they fulfill the requirements as outlined in the Endangered Species Act for issuance of an incidental take permit. (See the section in Chapter II on the Endangered Species Act for a discussion of these requirements.) The processes for addressing unforeseen or extraordinary circumstances, amending the HCP, review, and funding are among the issues discussed in the Implementation Agreement.

Funding

DNR shall submit to the Washington State Legislature, on at least a biennial basis, an agency operating and capital budget for asset management that will be adequate to fulfill DNR's obligations under the HCP, Incidental Take Permit, and Implementation Agreement. Failure by DNR to ensure that adequate funding is provided to implement the HCP shall be grounds for suspension or partial suspension of the Incidental Take Permit.

Transition Activities

Timber sales prepared by DNR normally require approximately 24 months of preparation between the planning of the sale and its eventual auction. The HCP conservation strategies require certain actions to occur (i.e., the designation of the 300-acre spotted owl nest patches) and certain materials be prepared (e.g., implementation procedures for riparian areas) in the first year after approval of the HCP and issuance of the Incidental Take Permit. Additionally, once implementation procedures are completed, training will be required for DNR staff. For these reasons, following approval of the HCP and issuance of the Incidental Take Permit, a transition period will be required. Timber sales in the DNR "pipeline" at the time of approval of the HCP will continue to be brought forward by DNR through the end of calendar year 1998, provided such sales are consistent with spotted owl survey agreements in effect between DNR and the U.S. Fish and Wildlife Service. Such sales will not include known occupied marbled murrelet sites or unsurveyed, suitable marbled murrelet habitat. Because of current DNR actions such as spotted owl survey efforts and the deferral of sale of marbled murrelet habitat, it is believed that take of any listed species will be limited to non-existent. Mitigation for any such take has been included in the conservation strategies contained within the HCP.

Monitoring

OBJECTIVES

DNR shall monitor this HCP on DNR-managed lands according to the following objectives for all planning units:

(1) to determine whether the HCP conservation strategies are implemented as written; and

(2) to determine whether implementation of the conservation strategies results in anticipated habitat conditions.

These two monitoring objectives can be referred to as implementation and effectiveness monitoring, respectively (U.S. Forest Service et al. 1994).

There is a third monitoring objective, referred to as validation monitoring (U.S. Forest Service et al. 1994), for DNR-managed lands in the Olympic Experimental State Forest (OESF) Planning Unit:

(3) to evaluate cause-and-effect relationships between habitat conditions resulting from implementation of the conservation strategies and the animal populations these strategies are intended to benefit.

Implementation monitoring will document the types, amounts, and locations of forest management activities carried out on DNR-managed lands in each HCP planning unit, both inside and outside areas addressed by the conservation strategies. Activities in areas addressed by the HCP will be described in sufficient detail to document compliance with the requirements of the conservation strategies. Activities outside of these areas will be described in summary detail. Implementation monitoring will also periodically describe changes in landscape-level habitat conditions in areas managed to provide spotted owl and murrelet habitat. Such monitoring will be primarily accomplished through DNR's planning and tracking, and geographic information systems. Statistically valid sampling of management activities will be conducted to evaluate the reliability of information stored in these databases.

Effectiveness monitoring will document changes in habitat conditions, including general forest structure, specialized habitat features (e.g., in-stream large woody debris, marbled murrelet nesting platforms), and spotted owl prey populations, that result from timber harvest and other forest management activities carried out pursuant to the HCP. Only habitat areas addressed by the conservation strategies, i.e., riparian, spotted owl nesting, roosting, and foraging (NRF), spotted owl dispersal, and marbled murrelet habitat areas, will be monitored for effectiveness. Within these habitat areas, representative samplings will be monitored, which means not all managed acres or management activities will be monitored. Effectiveness monitoring will rely upon field-based before-and-after comparisons. Changes in habitat conditions will be evaluated both in the short term (one to three years after harvest) and over the life of the HCP.

Validation monitoring, which will occur only within the OESF Planning Unit, will document spotted owl and marbled murrelet use of areas managed to provide nesting habitat, and salmonid use of streams crossing DNR-managed lands. For spotted owls and marbled murrelets, validation monitoring will rely upon surveys to detect changes in site occupancy, numbers and locations of breeding pairs, and reproduction, as appropriate for each species. For salmonids, validation monitoring will employ surveys to detect changes in the productivity of spawning adults and salmon-habitat relationships. As an additional objective for the OESF, validation monitoring reflects the emphasis on experimentation that defines the OESF. (See Section E in Chapter IV titled Olympic Experimental State Forest Planning Unit.) In this sense, the OESF will be an open-air laboratory in which the assumptions that underlie the conservation strategies will be tested.

MONITORING PROGRAM

Table V.1 outlines the monitoring program that results from applying the first two monitoring objectives to the major conservation strategies. (See the sections in Chapter IV on conservation strategies for the northern spotted owl, marbled murrelet, and riparian areas, and the unique spotted owl and riparian conservation strategies for the OESF.) Implementation and effectiveness monitoring will be carried out for all of these major strategies. The spotted owl conservation strategy, current spotted owl and marbled murrelet habitat, and current riparian ecosystem conditions are not uniform across planning units. Effectiveness monitoring will necessarily be tailored to the conservation strategy and habitat or ecosystem conditions in each planning unit.

Validation monitoring will be carried out for spotted owl nesting habitat, marbled murrelet nesting habitat, and salmonid habitat in the OESF. Validation monitoring will not be undertaken for the other conservation strategies or in other planning units. Validation monitoring will not be undertaken for spotted owl dispersal habitat. The OESF spotted owl conservation strategy does not draw the management distinction between NRF habitat and dispersal habitat that prevails in other HCP planning units. In the other planning units, an evaluation of the cause-and-effect relationship between conditions on DNR-managed lands and the ability of juvenile spotted owls to disperse successfully across the landscape would be difficult to design, expensive to implement, and impractical to undertake, given the distribution of DNR-managed lands. Resources for monitoring the HCP's success in providing dispersal habitat will be better directed at evaluating forest structure and prey responses (i.e., effectiveness monitoring) in areas that are specifically managed for spotted owl dispersal habitat.

Validation monitoring for salmonid habitat will be focused to detect changes in the productivity of spawning adults and salmon-habitat relationships, parameters that are not affected by marine conditions and downstream fisheries. This will involve estimating numbers of spawning adults and numbers of recruits (i.e., out migrating smolts or rearing juveniles), and surveying different stream habitat types and conditions to determine fish numbers, species composition, and densities. Validation monitoring for salmonid habitat will be conducted in an appropriate watershed unit comprised primarily of DNR-managed lands, to minimize the potential influences of management activities not under DNR's control. Validation monitoring will not be conducted for any other, non-salmonid fish species, or for wildlife species (other than spotted owls and marbled murrelets) influenced by the riparian/salmonid conservation strategy.

Effectiveness and validation monitoring need not be undertaken while the interim murrelet conservation strategy is in effect. Although lower quality habitat types that support up to 5 percent of the total murrelet use of DNR-managed lands within each of the five west-side and the OESF planning units may be harvested under the interim strategy, DNR will not alter or manage the higher quality murrelet nesting habitat, which supports 95 percent of potentially occupied sites, during this period. Neither will there be any attempt to alter or manage any habitat known to be occupied by murrelets, regardless of habitat quality. DNR expects to initiate effectiveness monitoring in all planning units where murrelet nesting habitat is a management goal once the long-term murrelet conservation strategy has been designed and implemented. DNR also expects to initiate validation monitoring in the OESF once the long-term murrelet conservation strategy is in place.

DNR recognizes the substantial financial commitment that the HCP monitoring program entails. DNR will provide adequate funding for monitoring to the extent that DNR is given the flexibility to make such budget decisions. DNR shall request funds from the legislature to cover the costs of the monitoring program. The exact funding level may vary from year to year, depending on actions of the legislature.

MONITORING PROCEDURES

Detailed procedures will be prepared to implement the monitoring approaches for each element of the HCP monitoring program outlined in Table V.1. These procedures will identify specific assumptions or hypotheses to be tested, data to be collected, sampling intensity and frequency, field and analysis methods, budgets, and timelines; the procedures will provide the level of detail anticipated in the U.S. Fish and Wildlife Service's Endangered Species Habitat Conservation Planning Handbook (USFWS and NMFS 1996). Monitoring procedures will be prepared by a team of scientists from DNR, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service. Implementation, effectiveness, and validation monitoring procedures will be completed and reviewed before forest management activities consistent with a conservation strategy are first undertaken. Tables V.2 and V.3 outline some of the environmental variables that will be measured as part of effectiveness monitoring for the spotted owl and riparian conservation strategies, respectively.

MONITORING REPORTS

DNR will prepare an annual report that describes the results of all monitoring activities carried out during the preceding calendar year. Monitoring reports will be completed and submitted to the U.S. Fish and Wildlife Service by March 30 of each year.

Table V.1: Outline of the HCP monitoring program

	HCP habitat goals			
Monitoring objective	**Spotted owl nesting, roosting, foraging habitat**	**Spotted owl dispersal habitat**	**Marbled murrelet nesting habitat[1]**	**Riparian/salmonid habitat**
Implementation	All planning units	All planning units	Five west-side planning units and the OESF	Five west-side planning units and the OESF
Effectiveness	All planning units	All planning units	Five west-side planning units and the OESF	Five west-side planning units and the OESF
Validation	OESF Planning Unit only		OESF Planning Unit only	OESF Planning Unit only (salmonid habitat only)

[1]Only implementation monitoring will be done during the interim conservation strategy for the marbled murrelet. See text.

Table V.2: Environmental variables to be measured in effectiveness monitoring for the spotted owl conservation strategy

Environmental Variables	
Spotted owl nesting, roosting, and foraging habitat	**Spotted owl dispersal habitat**
density of nesting structures snag density snag diameter distribution	
tree density tree species composition tree diameter distribution canopy closure canopy height woody debris ground cover prey density	

Table V.3: Environmental variables to be measured in effectiveness monitoring for the riparian conservation strategy

Salmonid Habitat Element	Environmental Variables
large woody debris	linear density size category tree species shape of form decay category poolforming function
channel characteristics	bankfull width bankfull depth stream gradient total water surface area pool maximum depth pool residual depth pool location pool frequency
sediments	percent of fine sediment in spawning gravel

MANAGEMENT ACTIVITIES IN PROGRESS OR UNDER WAY WHEN THE HCP IS ADOPTED

Management activities in progress or under way when the HCP is adopted that are exempt from compliance with the conservation strategies (see the Implementation Agreement) will be reported as part of implementation monitoring. Otherwise, such activities will not be monitored.

Research

OBJECTIVES

The conservation strategies in this HCP require that research be carried out to answer certain specific questions. These questions can be grouped under three broad research objectives:

- To obtain information needed to move from short- to long-term conservation strategies.
- To obtain information needed to assess and improve the effectiveness of the conservation strategies.
- To obtain information needed to increase management options and commodity production opportunities for lands managed pursuant to the HCP.

RESEARCH PRIORITIES AND TOPICS

These objectives give rise to three research priorities:

(1) Research that is a necessary part of a conservation strategy. DNR recognizes the interim nature of a short-term approach and has delayed management actions until new information is obtained.

(2a) Research needed to assess or improve conservation strategies that are in place. Information gaps that restrict DNR's ability to provide conservation benefits are evident, but DNR has not delayed management actions.

(2b) Research needed to increase management options and commodity production opportunities for lands managed pursuant to the HCP, including testing of new technologies and experimental application of silvicultural techniques.

(3) Research needed to improve general understanding of the animals, habitats, and ecosystems addressed by the HCP.

Research topics identified in the HCP can be prioritized accordingly.

Priority 1

Riparian

- Determine how to design and manage riparian buffers that maintain wind-firm streamside forests.
- Evaluate the local and downstream effects of forest management activities along Type 5 waters not associated with unstable slopes. Determine whether conditions necessitate buffers along Type 5 streams, and if so, determine how to design and manage such buffers.

Spotted Owl

- Determine the amounts of down woody debris necessary for nesting, roosting/foraging, and dispersal habitats.
- Develop better stand-level definitions for nesting habitat.
- Determine the amount and distribution of nesting habitat needed to support nesting spotted owls within managed forest landscapes.
- Develop better stand- and landscape-level definitions for dispersal habitat.
- Determine how to manage and harvest timber within nesting and roosting/foraging habitats.

Marbled Murrelet

- Evaluate the habitat relationships of murrelets occupying DNR-managed lands. Determine which areas and habitat conditions support nesting murrelets.
- Determine whether certain breeding sites are more important to the population than others and, if so, identify the conditions that influence these differences.
- Develop the ability to delineate the boundaries of breeding sites.
- Determine how to protect and manage breeding sites.
- Determine whether nesting murrelets can colonize unoccupied suitable habitat.

Priority 2

Riparian

- Determine how to harvest timber and meet conservation objectives within riparian areas.
- Determine how to harvest timber and meet conservation objectives on hillslopes with high mass-wasting potential without triggering land slides and causing adverse effects to fish habitat.
- Determine the best approach to growing healthy riparian buffers while managing the buffer for economic return.

Spotted Owl

- Determine the types, amounts, and configurations of habitat required to support spotted owls in managed forest landscapes.
- Develop the ability to accelerate development of functional spotted owl nesting and roosting/foraging habitats in conjunction with commercial silvicultural activities and timber harvest.
- Determine how to reduce the risk of catastrophic habitat loss due to fire, insects, or disease, while maintaining existing nesting and roosting/foraging habitats.

Marbled Murrelet

- Determine whether it is possible to harvest timber at or near breeding sites and meet conservation objectives.

Multispecies

- Determine how to design, create, and manage landscape-level habitat patterns to benefit a variety of native animals that use the various forest ages and structures in a geographic area.

- Determine how to best move these patterns across the landscape through time in order to allow maximum flexibility for timber harvest.

Priority 3

Riparian

- Develop basic information on the relationships between forest management activities and riparian ecosystems in managed forests.

- Develop basic information on the relationships between forest management activities and hydrology in managed forests, particularly the relationships among forest management activities, basin soils, and stream-channel/stream-bed changes during rain-on-snow floods.

Spotted Owl

- Determine whether snags are a necessary part of northern flying squirrel habitat in eastern Washington.

Marbled Murrelet

- Develop basic information on murrelet ecology.

Other research topics may arise as the HCP is implemented and new knowledge is obtained.

RESEARCH PROGRAM

DNR will actively manage the HCP research program to ensure that information is obtained in a timely and cost-effective manner and that research is accomplished with high standards of quality and credibility. DNR does not intend to create a large research infrastructure to conduct the necessary investigations. Most HCP research will be done for DNR by qualified research institutions through cooperative agreements and contracts. Certain applied research that requires close coordination with DNR operations may be carried out by DNR scientists. Some enhancement of current DNR infrastructure will be required to direct the research program, manage the information obtained, and ensure that new information is successfully incorporated into operational programs.

To the maximum extent possible, HCP research will be carried out on DNR-managed lands in the OESF Planning Unit, where management emphasizes research and experimentation. (See the section in Chapter I titled Why the OESF is Unique and Section E of Chapter IV on the OESF conservation strategies.) The special research relationship between DNR and the Olympic Natural Resources Center will enhance DNR's ability to meet HCP information needs. Research that cannot be carried out on the western Olympic Peninsula, or cannot be extrapolated from this planning unit, will take place on other appropriate DNR-managed lands.

There is considerable overlap between the HCP research priorities described previously and those envisioned for the OESF. (See the section in Chapter I titled Why the OESF is Unique.) However, it is important to note that the OESF has broader research objectives and different overall research priorities than those that are part of this HCP. In other words,

both priorities for the HCP and other, non-HCP priorities will shape the overall OESF research program. Research on watershed processes and aquatic habitats, the habitat needs of late seral species, ecosystem productivity and health, timber harvesting systems, landscape management, and other topics will be featured in the OESF, in addition to the HCP research topics described previously.

DNR recognizes the substantial financial commitment that the HCP research program entails. DNR will provide research funding commensurate with the importance of the HCP and the scope of the research questions to the extent DNR is given flexibility to make that decision. The exact funding level may vary from year to year, depending on actions of the Legislature, but DNR shall request at least $1 million per year for HCP research until the Priority 1 research topics listed above have been adequately addressed. In some cases, however, it may not be necessary for DNR to fund research on a particular topic. Other organizations may sponsor work that will generate the knowledge needed. An important part of the HCP research program will be to stay in touch with other Pacific Northwest research programs and assimilate information that can be used to meet HCP information needs.

RESEARCH PROCEDURES AND REPORTS

A research procedure will be prepared for each investigation that is part of the HCP research program. Research procedures will describe background and rationale, specific objectives, research approach, hypotheses to be tested, data to be collected, field and analysis methods, budgets, and timelines. A study's principal investigator(s) will prepare procedures for research in consultation with DNR. Investigators will also prepare annual reports that describe the results of work carried out during the preceding year, summarize data collected, and present preliminary data analyses. A comprehensive final report that includes detailed results, conclusions, and management recommendations will be prepared at the conclusion of each research project. DNR will emphasize rapid dissemination of research results to DNR managers, planners, and technical specialists, and rapid assimilation of new information into conservation and management approaches. DNR will also require investigators to seek publication of research results in refereed professional journals.

Reporting

The Implementation Agreement describes how reviews and inspections will occur.

DNR will provide the U.S. Fish and Wildlife Service and the National Marine Fisheries Service with standard year-end reports compiled through DNR's geographic information system or other methods, such as summaries of timber sales and other management activities. As discussed in the earlier section in this chapter titled Monitoring, DNR will also prepare an annual report that describes the results of all monitoring activities carried out during the preceding calendar year. Monitoring reports will be completed and submitted to the U.S. Fish and Wildlife Service by March 30 of each year.

1 **No Action/No Change (Current Practices)**

2 **No Harvest/No Take**

VI. Alternatives to the HCP that Would Avoid Take

VI. Alternatives to the HCP that Would Avoid Take

A discussion of the range of alternatives can be found in the Draft Environmental Impact Statement. However, to meet the requirements for an HCP, a brief discussion is included here of alternatives that would avoid take and why they are not as suitable for DNR-managed lands as operating under an HCP with incidental take permits. (A copy of the Draft Environmental Impact Statement can be obtained from DNR.)

No Action/No Change (Current Practices)

This alternative is considered in detail in the Draft Environmental Impact Statement. Like this HCP, the No Action/No Change alternative adheres to trust duties, state Forest Practices Rules, policies of the Board of Natural Resources, and laws of general applicability such as the Endangered Species Act.

Briefly, under the No Action/No Change alternative, DNR would not seek incidental take permits or an agreement on unlisted species from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. DNR would not implement a habitat conservation plan. To comply with the Endangered Species Act, DNR's trust land management would be regulated by the federal government and guided by the policies of the Board of Natural Resources as stated in the 1992 Forest Resource Plan.

DNR would continue management policies and practices designed to reduce the risk of violating the Endangered Species Act. Specific policies and practices with regard to compliance with federal law are not necessarily associated with state Forest Practices Rules. Risk-management practices or policies include:

(1) conducting two-year surveys on proposed timber sales in suitable spotted owl habitat;

(2) deferring from sale some suitable spotted owl habitat within the boundary of the Olympic Experimental State Forest;

(3) deferring timber sales involving potential marbled murrelet habitat within 40 miles of marine waters and conducting a case by case review of sales between 40 and 52.25 miles;

(4) conducting marbled murrelet habitat relationship studies to assist the Board of Natural Resources in determining an acceptable level of risk; and

(5) screening certain other sales for potential taking of a federally listed species.

Under the No Action/No Change alternative, the focus of DNR's conservation efforts related to compliance with the Endangered Species Act is on current habitat conditions. Existing suitable habitat for murrelets would be essentially off limits for harvest; and in areas now occupied by spotted owls, sales would be offered only where there is more than 40 percent habitat within a circle. Where survey information shows a spotted owl activity center (or circle) has been abandoned, additional acres would be available for sale upon the completion of a series of decertification surveys. Conversely, where surveys show new spotted owl activity and habitat below the 40 percent threshold, these areas would be off limits. The No Action alternative assumes DNR will continue to survey in an attempt to clear for harvest as much mature timber as possible, but also that the Board would continue its current risk-management approach regarding sales in suitable habitat. The costs of complying with the Endangered Species Act would include the costs of continuing the current survey program.

Uncertainty regarding compliance with the Endangered Species Act is the dominant feature of this alternative and would continue through time. Requirements could stiffen, more species could be listed, or requirements could relax with changes in federal policy. DNR would respond to changing the Endangered Species Act requirements and take precautions when guidance is lacking to ensure compliance with the Endangered Species Act.

The No Action/No Change alternative does not allow DNR to provide the same level of certainty, stability, and flexibility as the HCP would in carrying out DNR's duties as trust manager. (See the section of Chapter II titled Trust Duties.) Because of the continuing changes in regulations to avoid take of a listed species and the possible listings of additional species with more resulting regulations, there is a degree of uncertainty that inhibits DNR's management. Such uncertainty causes lack of stability in DNR's timber sales program, which is the primary source of revenue for the trusts. Uncertainty also limits flexibility in operations. In contrast, it is expected that the HCP will allow DNR to better meet its duty to the trust of striving to produce the most substantial support possible over the long term consistent with all trust duties conveyed on DNR by the state of Washington.

No Harvest/No Take

Briefly, under the No Harvest alternative, DNR would achieve compliance with the Endangered Species Act by not conducting harvest activities, building roads, or conducting other land management activities within or near existing and potential habitat for listed and candidate species. Forested trust lands would be unmanaged in an effort to grow new habitat for listed and candidate species. This alternative is not feasible because it would not allow DNR to meet its legal obligations to the trusts. (See the section of Chapter II titled Trust Duties.) To eliminate the state's responsibilities as trustee, the State Enabling Act and the State Constitution would have to be amended.

A.

Appendix - Geographic Analysis

Appendix A. Geographic Analysis

Much of the underlying analysis for the conservation strategies in the HCP was supported by DNR's geographic information system.

A geographic information system (GIS) is a system of integrated processes for the entry, analysis, and query of any data that can be referenced to a specific location. Comprised of computer hardware and software, geographic data, support staff, and applications, the purpose of a GIS is to provide meaningful geographic information in either map or report form.

A GIS query can take either of two general forms. In one form, the user begins with a specific known location (e.g., a timber stand, ownership parcel, or stream segment) and queries the GIS for all characteristics of that location (e.g., age of timber, owner of parcel, or name of stream). For the other form of query, the user enters a list of desired characteristics, without knowledge of where they exist, and queries the GIS for the locations having those characteristics (e.g., stands with timber more than 60 years old, owned by the county, or within 1 mile of the Rushing River).

DNR has been developing its GIS since 1982 and now has a well established, state-of-the-art system. Its client-server architecture consists of a central corporate database, more than 40 workstations, ARC/INFO software, and nearly 400 trained DNR staff. The GIS has become integrated into almost every facet of DNR's daily operations.

For the HCP, DNR's GIS has been used in two general phases: (1) initially providing information to evaluate the current situation, and (2) modeling potential conservation strategies and analyzing results. For the first phase, a large amount of statewide geographic data was required to help lay the foundation of the HCP and define conservation objectives. To avoid producing endless numbers of maps with all possible combinations of geographic data, DNR staff developed a computer menu that allowed any combination of data to be selected and mapped on the computer screen. During Science Team meetings, the maps were displayed through an overhead projector so that the scientists could query the GIS and see the results. Aided by map analyses, the Science Team and DNR determined the wildlife species on which to focus efforts, the resulting geographic extent of the HCP, and the appropriate geographic subunits to use for more detailed analysis.

The second phase — modeling and analysis — used the GIS to its full potential. The breadth and variety of GIS use in this context can best be shown by the following examples. For modeling the conservation strategies for the northern spotted owl and marbled murrelet, the GIS was used to map and evaluate:

- elevation breaks and observed sightings defining the Washington range of both species;
- spatial relationships between DNR-managed forest lands and federal reserves;

- distribution of potential habitat across lands managed by various state and federal agencies; and
- timber age distributions on DNR-managed forest lands.

For developing riparian ecosystem conservation strategies, the GIS was used to map and evaluate:

- stream densities (miles of stream per square mile) by stream type;
- miles of stream, summarized by stream type;
- stream gradients, summarized by stream type;
- hillslopes and slope shapes (for predicting areas of slope instability);
- elevation, rainfall, vegetation, and latitude (to predict rain-on-snow zones, which in turn may predict runoff problems);
- areas where soils may be susceptible to erosion when disturbed;
- various stream buffering scenarios, along with their contribution to habitat and effect on timber harvest activities;
- road densities (miles of road per square mile);
- road/stream intersections (bridges, culverts, fords) as potential trigger points for storm runoff; and
- stream stocking status for anadromous fish.

Approximately 85 percent of the geographic data utilized were already resident in DNR's GIS. The remainder was acquired primarily from the U.S. Forest Service and the Washington Department of Fish and Wildlife.

Any GIS data is, by definition, only a *model* of reality — a snapshot of conditions that are highly complex and dynamic. Although computer automation can give a very high level of precision, it does not in itself assure accuracy. Accuracy is achieved and maintained only at significant cost and is relative to the specific need. Therefore, while all the data used in GIS analysis are of a reasonably high quality, great diligence was exercised throughout the process to assure that the data were not used beyond their inherent limitations.

The GIS has been an important tool for communicating among the scientists, DNR staff, other government agencies, the beneficiaries, and the general public. It was a fundamental aid in establishing confidence in the conservation strategies. The GIS will continue to play a large part in implementing and monitoring the HCP.

B.

Appendix - Implementation Agreement

Appendix B. Implementation Agreement

IMPLEMENTATION AGREEMENT FOR THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES HABITAT CONSERVATION PLAN

THIS AGREEMENT is made and entered into as of the 30th day of January, 1997, by and between the Secretary of the Interior acting through the United States Department of the Interior, as represented by the UNITED STATES FISH AND WILDLIFE SERVICE ("USFWS"), an agency of the federal government, the Secretary of Commerce acting through the NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION as represented by the NATIONAL MARINE FISHERIES SERVICE ("NMFS"), an agency of the federal government, and the WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES, ("DNR"), an agency of the State of Washington, which includes the WASHINGTON STATE BOARD OF NATURAL RESOURCES ("BOARD").

BACKGROUND

1.0 DNR manages approximately 2.1 million acres of forest lands within the State of Washington.

2.0 Approximately 1.6 million acres of DNR-managed forest lands are within the range of the Northern Spotted Owl *(Strix occidentalis caurina), ("the Owl").*

3.0 The Marbled Murrelet *(Brachyramphus marmoratus)*, Bald Eagle *(Haliaeetus leucocephalus)*, Grizzly Bear *(Ursus arctos)*, Gray Wolf *(Canis lupus)*, Peregrine Falcon (Falco peregrinus), Columbian White-tailed Deer *(Odocoileus virginianus leucurus)*, Aleutian Canada Goose *(Branta canadenis leucopareia)*, and Oregon Silverspot Butterfly *(Speyeria zerene hippolyta) (hereafter known collectively as "other federally listed species")* occur or may occur on the PERMIT LANDS.

4.0 The aforementioned species are listed as threatened or endangered under the Federal Endangered Species Act, 16 U.S.C. § 1531, *et seq.*, ("ESA"), and any taking, as that term is used in the ESA, of these species is prohibited, except as permitted by the ESA.

5.0 Incidental takings in accordance with an Incidental Take Permit ("ITP") issued by the SERVICES in conjunction with approval of a Habitat Conservation Plan ("HCP") are authorized by the ESA.

6.0 DNR, with technical assistance from the SERVICES and others, has prepared an HCP for the Owl and other species that may use the types of habitat that occur on the PERMIT LANDS.

7.0 DNR has applied to have the ITP include the Owl and other federally listed species that may currently use the types of habitats that occur on PERMIT LANDS; and to have the ITP, as amended from time to time, include every species that becomes listed after the effective date of this Implementation Agreement ("Agreement") and that may now or hereafter use the types of habitats that occur within the five Westside Planning Units of the PERMIT LANDS and the Olympic Experimental State Forest (OESF).

8.0 The SERVICES require an Implementation Agreement to be signed by all PARTIES associated with issuance of an ITP for a long-term HCP.

9.0 The purposes of this Agreement are to obtain an approved HCP and ITP covering DNR-management activities on the PERMIT LANDS; to implement the HCP; to commit the PARTIES to fulfill and faithfully perform their respective obligations, responsibilities, and tasks to the extent consistent with their respective authorities; to identify remedies and recourse should any of the PARTIES fail to perform such obligations, responsibilities, and tasks; and to provide for regulatory relief, stability, and species conservation.

10.0 The SERVICES have given full consideration to the HCP and this Agreement and found them to meet the requirements for issuance of an ITP under the ESA.

11.0 DNR has given full consideration to the HCP, its alternatives, the ITP, and this Agreement and found the HCP, the ITP, and this Agreement to be in the best interest of each of the trusts.

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained below, the PARTIES agree as follows:

AGREEMENT

12.0 Definitions. The terms of the HCP, and this Agreement shall be interpreted as supplementary to each other, but in the event of any direct contradiction between the terms of the HCP and this Agreement, the terms of this Agreement shall control. Terms capitalized in this document shall have the meanings set forth in this section.

12.1 The terms "PARTY" and "PARTIES" shall mean one or all of the following: the Secretary of the Interior acting through the United States Department of the Interior, as represented by the USFWS, the Secretary of Commerce acting through the National Oceanic and Atmospheric Administration, as represented by NMFS, and DNR, including the BOARD.

12.2 The terms "SERVICE" and "SERVICES" shall mean the USFWS and/or the NMFS acting on behalf of their respective Secretaries.

12.3 The terms "ITP" and "PERMIT" shall mean an incidental take permit issued to DNR pursuant to Section 10(a) of the ESA to authorize any incidental take of listed species which may result from otherwise lawful DNR-management activities on PERMIT LANDS, which are conducted in accordance with the HCP and this Agreement.

12.4 The term "PERMIT LANDS" shall mean the lands covered by the ITP and HCP, as referred to in section 15.1 of this Agreement.

12.5 The term "HCP" shall mean the Habitat Conservation Plan prepared by DNR, and as amended.

12.6 The term "SPECIES ADDRESSED IN THE HCP" includes all species currently listed as threatened or endangered that may use the types of habitat found on the PERMIT LANDS, and all species hereafter listed as threatened or endangered that may use the types of habitat found within the five Westside Planning Units and the OESF. These species include species listed under the ESA or afforded similar status or protection by federal law or regulation applicable to or affecting the PERMIT LANDS during the term of the HCP.

12.7 The term "DAYS" shall mean calendar days.

12.8 The term "COMPLIANCE" shall mean substantial compliance with the commitments of the HCP, ITP, and this Agreement.

12.9 The terms "DEMONSTRATES" and "DEMONSTRATING" shall mean to establish the existence of a condition or development by use of the best scientific and/or commercial data available.

12.10 The term "PEER REVIEWED" shall mean that consistent with section B(1) of the Interagency Cooperative Policy for Peer Review in Endangered Species Activities (59 Fed. Reg. 34,270), the SERVICES will provide for peer review of the scientific data on which the agencies base any finding requiring peer review in this Agreement to ensure that any such findings are based on the best scientific and commercial data available. The SERVICES will request peer review so that the reviews will be completed within seventy-five (75) DAYS of DNR's request. In the event peer review of such data is not available in time to enable the SERVICES to meet their obligations established by statute, regulation, or this Agreement, the required finding or decision based on such data will be effective, but will be reconsidered by the SERVICES as soon as that information becomes available.

13.0 Incorporation by Reference. The HCP is intended to be, and by this reference is, incorporated herein.

14.0 Responsibilities of the PARTIES. The PARTIES agree to be bound by and to the commitments of the HCP, the ITP, and this Agreement, subject to amendment, renewal, or termination as provided herein.

15.0 PERMIT LANDS.

15.1 PERMIT LANDS Description. Contained in Map I.1 of the HCP, and incorporated herein by reference, are Geographic Information Systems (GIS) data describing the PERMIT LANDS subject to the HCP, the ITP, and this Agreement. Said lands are referred to in the HCP, the ITP, and this Agreement variously as the "DNR-managed lands in the area covered by the HCP," "PERMIT LANDS," the "DNR forest lands," the "DNR-managed lands," the "lands within the planning units," and other similar terms. All such terms, unless otherwise indicated, used in the HCP, the ITP, or this Agreement refer to those lands identified in Map I.1 of the HCP as "DNR-managed HCP lands."

15.2 Natural Area Preserves and Natural Resource Conservation Areas. DNR manages approximately 45,000 acres of Natural Area Preserves ("NAPs") and Natural Resource Conservation Areas ("NRCAs") that lie within the range of the Owl. Approximately 14,765 acres of these lands have been designated as important for achieving the commitments of the HCP. It is expected that the designated lands will continue to provide this habitat in the future and this habitat will count as mitigation so long as such habitat remains present. DNR will notify the SERVICES if the designated lands, or a portion thereof, will no longer be managed consistent with the commitments of the HCP. While not subject to the commitments of the HCP or this Agreement, so long as they are managed consistent with the commitments of the HCP, the SERVICES will give DNR credit for the habitat provided by the designated lands in terms of meeting the commitments assigned to DNR in the HCP, the ITP, and this Agreement. Whether the designated lands continue to provide this habitat, and the mitigation if they do not, will be considered by the SERVICES at the time the SERVICES are notified by DNR that the designated lands will no longer be managed consistent with the commitments of the HCP. Take incidental to DNR-management activities on the designated lands is authorized by the ITP so long as such take is in COMPLIANCE with the HCP, the ITP, and this Agreement.

16.0 Forest Product Sales and Other Management Activities Other Than Land Sales, Purchases, and Exchanges.

16.1 Management Activities Subject to this Agreement. DNR has an active management program for its PERMIT LANDS, including but not limited to forest practices, forest product sales, other valuable material sales, licenses, permits, leases, rights-of-way, and public uses. So long as the SERVICES have not suspended or revoked the ITP under section 26.0 of this Agreement or DNR has not terminated the ITP under section 27.0, the ITP will authorize any incidental take otherwise prohibited by the ESA which may result from otherwise lawful DNR-management activities that are conducted in accordance with the HCP and this Agreement.

16.2 Management Activities in Progress or Under Way.

a. Timber Sales. DNR will incorporate the relevant commitments of the HCP into all timber sales sold on or after January 1, 1999. DNR may, but is not required to, incorporate the commitments of the HCP into timber sales sold prior to January 1, 1999.

b. Nontimber Resource Activities. Excepting designations and leases under subsection 25.3.a(2) of this Agreement, DNR will incorporate the relevant commitments of the HCP into all nontimber resource transactional documents pertaining to PERMIT LANDS including, but not limited to, leases, licenses, permits, contracts, and sales, executed on or after January 1, 1999. DNR may, but is not required to, incorporate the commitments of the HCP into nontimber resource transactional documents pertaining to PERMIT LANDS including, but not limited to, leases, licenses, permits, contracts, and sales, executed prior to January 1, 1999. As leases, licenses, contracts, and permits of PERMIT LANDS are renewed, DNR shall alter such leases, licenses, contracts, and permits, to the extent permitted by law, to ensure compatibility with the commitments of the HCP. The level of nontimber resource activity and associated take, if any, of SPECIES ADDRESSED IN THE HCP will be reviewed annually in conjunction with the annual meeting under subsection 17.2 of this Agreement. The annual review meetings will be used by the PARTIES to ensure that any expansion in the level of DNR's nontimber resource activities, as described in

Chapter IV of the HCP, that occur on PERMIT LANDS do not result in increased incidental take of SPECIES ADDRESSED IN THE HCP. If increased incidental take will result, DNR will initiate the amendment process under subsection 25.3(b)-(c) of this Agreement. At the annual meeting, DNR will provide the SERVICES with the results of the nontimber resource monitoring efforts as described in the HCP.

16.3 Severability. Management activities on DNR lands are often accomplished through an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser. Take incidental to otherwise lawful activities of these entities is authorized by the ITP so long as such take is authorized by DNR and is in COMPLIANCE with the HCP, the ITP, and this Agreement. A violation of the ITP by an agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser, which was not authorized by DNR, shall not result in the suspension, revocation, or termination of the ITP, nor shall it affect other benefits, rights, or privileges under the ITP, except as to that agent, lessee, licensee, contractor, permittee, right-of-way grantee, or purchaser.

17.0 Land Transfers, Purchases, Sales, and Exchanges. DNR has an active program of land acquisition and disposition, including but not limited to land transfers, sales, purchases, and exchanges. This program includes intergrant transactions. The HCP provides for continuation of this program.

17.1 Conservation Objectives of the HCP. The HCP and this Agreement recognize that it is necessary for DNR to continue to pursue an active land disposition program. In carrying out such an active land disposition program, DNR commits to maintaining the conservation objectives described in Chapter IV of the HCP in the course of its land disposition program. DNR may dispose of PERMIT LANDS, including PERMIT LANDS within any Watershed Administrative Unit ("WAU"), or any quarter-township in eastern Washington, even though such a disposition is not in accord with the habitat goals for a particular WAU, or quarter-township, so long as the conservation objectives described in Chapter IV of the HCP are maintained. Annual and other meetings held under section 17.2 will address whether disposition of PERMIT LANDS would have a significant adverse effect on the conservation objectives described in Chapter IV of the HCP.

17.2 Notification and Annual Review of Land Transactions. The PARTIES will hold annual meetings in December of each year, unless otherwise mutually agreed upon by the PARTIES, to review proposed and completed land transactions involving PERMIT LANDS. At such meetings, DNR will notify the SERVICES in writing of any known proposed land transfers, purchases, sales, or exchanges expected to occur within the upcoming year involving PERMIT LANDS. A follow up meeting will be held within sixty (60) DAYS after the annual meeting, if needed. Additional meetings may be convened on a more frequent basis or incorporated into the scheduled comprehensive reviews contemplated under section 21.0 with the mutual consent of the PARTIES. DNR will mail to the SERVICES preliminary transactional documents at the time such documents are mailed to the BOARD for all land transactions involving PERMIT LANDS that were not discussed during the annual meetings. DNR will also mail the closing documents to the SERVICES within thirty (30) DAYS of closing for all transactions involving PERMIT LANDS. Neither SERVICE, however, shall have the power to veto any land transaction. DNR will amend annually, or more frequently if it desires, the HCP pursuant to section 25.3 of this Agreement to reflect lands added to or removed from the PERMIT LANDS. In no event will DNR conduct management activities that will result in take on lands that will be added to the ITP prior to amendment of the HCP.

17.3 Land Acquisition by Transfer, Purchase, or Exchange. The PARTIES shall, upon request by DNR, add lands acquired by transfer, purchase, or exchange within the range of the Owl to the HCP, ITP, and this Agreement. DNR will incorporate the relevant commitments of the HCP into the management of these new PERMIT LANDS. No additional mitigation will be required unless the management of these new PERMIT LANDS increases take beyond the level authorized in the ITP. If the management of these new PERMIT LANDS increases take beyond the level authorized in the ITP, then any additional mitigation will be determined through amendment of the HCP based on mutual agreement among the PARTIES. DNR, at its sole discretion, may at any time add acquired lands to the WAU or quarter-township base referred to in Chapter IV of the HCP, but is not required to do so. So long as land DNR seeks to add to the HCP in accordance with this paragraph does not increase the level of take, it shall be the subject of a minor amendment to the HCP pursuant to section 25.3 and shall thereafter be PERMIT LANDS.

17.4 Land Disposition by Transfer, Sale, or Exchange. DNR, at its sole discretion, may voluntarily dispose of PERMIT LANDS by transfer, sale, or exchange. DNR, at its sole discretion, may require that the recipient of the disposed land commit to managing the disposed land in accordance with the HCP and this Agreement. DNR is not required by the HCP, the ITP, or this Agreement to require continuation of the commitments of the HCP or this Agreement on the disposed land. If DNR sells or exchanges DNR-managed lands, NAPs, or NRCAs, and the acquiring entity commits in writing to the SERVICES that the lands disposed by DNR will be managed in a manner which maintains the commitments of the HCP, DNR will continue to be given credit for such lands for the purpose of determining whether DNR is in COMPLIANCE with the HCP, the ITP, and this Agreement. If land disposed of by DNR does not remain subject to the provisions of the HCP, and the cumulative impact of the land disposition would have a significant adverse effect on the affected species, the PARTIES, based on the best scientific and commercial data available at the time, shall amend the HCP, this Agreement, and the ITP to provide replacement mitigation for the affected species pursuant to the standards and processes outlined in the extraordinary circumstances provisions of section 24 herein.

17.5 Federal Condemnation. In the event of condemnation of DNR-managed lands, NAPs, or NRCAs by the federal government, the PARTIES shall not be required to replace mitigation lost due to condemnation. The PARTIES' obligations relating to the condemned lands under the HCP and this Agreement shall be terminated.

17.6 Rights and Authorities Preserved. Except as otherwise specifically provided in this Agreement, nothing herein contained shall be deemed to restrict the rights, privileges, and powers of the State of Washington or DNR to manage the use of, or exercise all of the rights incident to, land ownership associated with the PERMIT LANDS. Nothing herein contained shall be interpreted to restrict the authority of the SERVICES to administer the ITP with respect to the PERMIT LANDS in accordance with this Agreement and the ESA.

18.0 Funding. DNR shall submit to the Washington State Legislature, on at least a biennial basis, an agency operating and capital budget for asset management that will be adequate to fulfill DNR's obligations under the HCP, ITP, and this Agreement. Failure by DNR to ensure adequate funding is provided to implement the HCP shall be grounds for suspension or partial suspension of the ITP.

The SERVICES shall include in their annual budget requests sufficient funds to fulfill their respective obligations under the HCP, ITP, and this Agreement.

19.0 Duration.

19.1 Term of PERMIT. The HCP, ITP, and this Agreement shall remain in full force and effect for a period of seventy (70) years from the effective date, or until revocation under section 26.0 or termination under section 27.0 of this Agreement, whichever occurs sooner. Amendments to the HCP, the ITP, or this Agreement shall be in full force and remain in effect for the then remaining term of this Agreement or until revocation under section 26.0 or termination under section 27.0 of this Agreement, whichever occurs sooner.

19.2 PERMIT Renewal. Unless revoked under section 26.0 or terminated under section 27.0 of this Agreement, DNR may renew the PERMIT, HCP, and this Agreement on the existing terms or other mutually agreeable terms three (3) times for a period of up to ten (10) years per renewal, provided:

(a) DNR is in COMPLIANCE with the HCP and this Agreement;

(b) the PARTIES have met approximately three (3) years prior to the scheduled PERMIT or renewal period expiration date to discuss the renewal of the PERMIT, HCP, and this Agreement, and DNR provides the SERVICES with at least eighteen (18) months notice of its intent to renew the PERMIT;

(c) DNR finds that renewal of the PERMIT, HCP, and this Agreement would be in the best interest of each of the trusts; and

(d) the sum of the original PERMIT term and any continuation or renewal periods does not exceed one hundred (100) years.

19.3 PERMIT Continuation. Unless revoked under section 26.0 or terminated under section 27.0 of this Agreement, the SERVICES may require DNR to continue implementing the HCP, PERMIT, and this Agreement for up to three (3) periods of up to ten (10) years apiece, provided that:

(a) at the end of the original PERMIT term or the continuation periods under this subsection, the SERVICES DEMONSTRATE that DNR has failed to achieve its commitments under the HCP as described in Chapter IV of the HCP;

(b) the PARTIES have met approximately three (3) years prior to the scheduled expiration date to discuss the potential for continuation or renewal of the HCP, PERMIT, and this Agreement, and the SERVICES provide DNR with at least eighteen (18) months notice of their intent to require continuation of the HCP, PERMIT, and this Agreement; and

(c) the sum of the original PERMIT term and any continuation or renewal periods does not exceed one hundred (100) years.

20.0 Reporting and Inspections. DNR will provide the SERVICES with two (2) copies of each report described in Chapter V of the HCP, at the addresses designated by the SERVICES, and any readily available existing information requested by either SERVICE to verify the information contained in such reports. Either SERVICE may inspect PERMIT LANDS in accordance with its then applicable regulations. Except as provided in its regulations, the inspecting SERVICE will notify DNR thirty (30) DAYS prior to the date they intend to make such inspections and allow DNR representatives to accompany SERVICE personnel when making inspections. To assist DNR in meeting its obligations under this Agreement, the SERVICE will brief DNR in writing on the factual information learned during any inspection within thirty (30) DAYS of such inspection, except as provided in its regulations.

21.0 Comprehensive Reviews. The PARTIES to this Agreement will conduct periodic reviews of the HCP, the ITP, and this Agreement, consulting with one another in good faith to identify any amendments that might more effectively and economically mitigate any incidental take. The PARTIES shall conduct comprehensive reviews within one month of the first, fifth, and tenth, anniversaries of the effective date and every tenth anniversary thereafter for the full term that this Agreement is in effect. Upon mutual agreement of all the PARTIES, additional reviews may be scheduled at any time.

22.0 Adequacy and Certainty.

22.1 Assurances. The HCP provides habitat conservation for all SPECIES ADDRESSED IN THE HCP, while providing regulatory relief, certainty, flexibility, and stability for DNR. Specifically, the conservation strategies afforded all habitat types, and the species specific measures of the HCP and this Agreement, adequately provide for all SPECIES ADDRESSED IN THE HCP and contain measurable criteria for the biological success of the HCP. Unless the SERVICES have suspended or revoked the ITP under section 26.0 of this Agreement or have not added a newly listed species to the PERMIT under subsection 25.1(b) of this Agreement, DNR is assured by this Agreement that any incidental taking of a SPECIES ADDRESSED IN THE HCP in the course of its otherwise lawful management activities will be authorized under the ESA. The SERVICES are assured by this Agreement that the incidental taking authorized by the ITP is consistent with the conservation of the species under the ESA.

22.2 Findings by the SERVICES. Based upon the best scientific and commercial data available and after careful consideration of all comments received, the SERVICES have found that with respect to all SPECIES ADDRESSED IN THE HCP:

(a) that any take on PERMIT LANDS under the HCP will be incidental;

(b) the impacts of any incidental take under the HCP will, to the maximum extent practicable, be minimized and mitigated;

(c) that DNR will ensure that adequate funding for the HCP will be provided in accordance with this Agreement and the HCP;

(d) that any taking of a SPECIES ADDRESSED IN THE HCP will not appreciably reduce the likelihood of the survival and recovery of such species in the wild; and

(e) that other measures and assurances required by the SERVICES as being necessary or appropriate for the purposes of the HCP are met.

23.0 Unforeseen Circumstances.

23.1 Unforeseen Circumstances Consultation. In the event of unforeseen circumstances arising in connection with the HCP, the ITP, or this Agreement, the appropriate SERVICE may request consultation with DNR regarding those circumstances and may suggest modifications to the commitments of the HCP, the ITP, or this Agreement. DNR shall consult with the SERVICE to explore whether there is a mutually acceptable means for adjusting the commitments of the HCP, the ITP, and this Agreement that maintains the interests of all PARTIES. If the cost of a mutually acceptable adjustment would be significant to DNR, then the PARTIES must strive to find further or different voluntary adjustments that would avoid or minimize the cost to DNR. The SERVICES shall not seek from DNR without its consent a commitment of additional land or financial undertaking beyond the level of mitigation which is provided under the commitments of the HCP, the ITP, and this Agreement.

23.2 Findings of Unforeseen Circumstances. The SERVICES shall have the burden of DEMONSTRATING that unforeseen circumstances have arisen. If DNR, after consultation and in its sole discretion, does not agree voluntarily to implement the requested changes, then the SERVICE must look to section 24.0 regarding extraordinary circumstances if it wishes to continue to pursue changes, and must satisfy the provisions of section 24.0 regarding such desired changes. The SERVICES agree that so long as DNR is in COMPLIANCE with its commitments under the HCP, ITP, and this Agreement, they will not impose on DNR any nonconsensual additional land-use restrictions, financial obligations, or any other form of additional mitigation for any SPECIES ADDRESSED IN THE HCP except under extraordinary circumstances as addressed in section 24.0.

24.0 Extraordinary Circumstances.

24.1 Extraordinary Circumstances Defined. Additional mitigation requirements shall not be imposed upon DNR without its consent provided DNR is in COMPLIANCE with the HCP, the ITP, and this Agreement, and the HCP is properly functioning, except under extraordinary circumstances. Extraordinary circumstances shall mean that continued DNR-management activities in accordance with the HCP, the ITP, and this Agreement would result in a substantial and material adverse change in the status of a species that was not foreseen on the effective date of this Agreement which can be remedied by additional or different mitigation measures on the PERMIT LANDS. The SERVICES shall have the burden of DEMONSTRATING that extraordinary circumstances exist.

24.2 Findings of Extraordinary Circumstances. Findings of extraordinary circumstances must be clearly documented in writing and based upon reliable, PEER REVIEWED technical information regarding the status and habitat requirements of the affected species. Furthermore, in deciding whether any extraordinary circumstances exist with respect to a particular SPECIES ADDRESSED IN THE HCP, which might warrant additional mitigation, the SERVICES shall consider, but not be limited to the following factors:

(a) the size of the current range of the affected species;

(b) the percentage of range adversely affected by the HCP;

(c) the percentage of range conserved by the HCP;

(d) the ecological significance of that portion of the range affected by the HCP;

(e) the level of knowledge about the affected species and the degree of specificity of the species conservation program under the HCP;

(f) whether the HCP was originally designed to provide an overall net benefit to the affected species and contained measurable criteria for assessing the biological success of the HCP; and

(g) whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the particular species in the wild.

Upon a finding of extraordinary circumstances, the SERVICES will have ninety (90) days to determine any additional mitigation necessary, during which time DNR will use its best efforts to avoid a substantial and material adverse change in the status of the affected species. If the SERVICES are unable to achieve appropriate additional mitigation, the SERVICES shall work with DNR to find the least disruptive method of continuing DNR-management activities.

24.3 Effect of Additional Mitigation Measures on the HCP. Any additional mitigation measures approved under this section shall change the original terms of the HCP only to the minimum extent necessary and shall be limited to modifications on the PERMIT LANDS, and any additional mitigation requirements under this Agreement shall not involve additional financial commitments by DNR or land use restrictions on DNR without its express written consent. The SERVICES may seek additional funding for mitigation from other sources.

24.4 SERVICES Free to Take Independent Action. Nothing in this Agreement shall be construed to limit or constrain either SERVICE from carrying out lawful additional mitigation actions at their own cost with respect to the protection of any listed species, or endeavoring to provide mitigation by means of other resources or financial assistance to DNR to the fullest extent possible in accordance with law and available appropriations.

24.5 Adaptive Management. Adaptive management provides for ongoing modifications of management practices to respond to new information and scientific developments. The monitoring and research provisions of the HCP are in part designed to identify modifications to existing management practices. The following adaptive management practices shall be implemented by DNR as reasonably necessary to respond to the following changes of circumstances and are not subject to subsections 23.1, 23.2, 24.1, 24.2, and 24.3:

(a) the best available scientific and commercial data indicate that an increase in the percentage of ground cover of dead and down wood is required for the support of the Owl in the definition of sub-mature habitat in Chapter IV section A of the HCP, provided DNR's responsibility shall be limited to 15 percent ground cover averaged over a stand;

(b) the best available scientific and commercial data indicate that the model used to delineate mass wasting on a site-specific basis under Chapter IV section D of the HCP can be reasonably improved to increase its accuracy;

(c) the best available scientific and commercial data indicate that the landscape-based road network management process described in Chapter IV section D of the HCP can be reasonably and practically improved, considering both the costs and benefits of implementing the improvement;

(d) the necessity for continued provision of nest patches has changed as a result of conducting research to determine the biological feasibility of using silvicultural techniques to create spotted owl nesting habitat;

(e) with specific reference to the marbled murrelet, the habitat definitions will be refined for each planning unit as a result of DNR's habitat relationships study;

(f) with specific reference to the marbled murrelet, the interim conservation strategy will be replaced with a long-term management plan upon completion of the inventory survey phase;

(g) management activities allowed within the riparian management zones will be refined within the first decade of the HCP;

(h) wind buffer management is refined as this priority research item is addressed;

(i) a long-term conservation strategy for forest management along Type 5 Waters is developed and incorporated into the HCP at the end of the first ten years of the HCP; and

(j) prescriptions resulting from a completed watershed analysis call for additional measures than those specified in the HCP.

All other adaptive management strategies are subject to subsections 23.1, 23.2, 24.1, 24.2, 24.3, and 24.4.

25.0 Amendments and Modifications.

25.1 PERMIT Amendments and Modifications. The ITP may be amended or modified as follows:

a. General Amendments to the ITP. The ITP can be amended or modified in accordance with SERVICE regulations as provided in this Agreement. If the federal regulations that govern PERMIT amendment have been modified from those codified at 50 C.F.R §§ 13.23, 220.11, 222.25, and 222.26, as of the effective date of this Agreement, the modified regulations will apply only to the extent the modifications are required by subsequent enactment of the Congress or

court order, or upon a determination by DNR that application of the modifications is in the best interests of the relevant trusts.

b. New Listings. The ITP for the Owl and other federally listed species that may currently use the types of habitats that occur on the PERMIT LANDS will be issued contemporaneously with the signing of this Agreement. In the future, the SERVICES shall add to the ITP, within sixty (60) DAYS of receipt by the appropriate SERVICE of a written request by DNR, each species that may use the types of habitats that occur within the five West Side Planning Units and the OESF that is listed as a threatened or endangered species during the term of this Agreement at the level of take requested by DNR and supported by the HCP without requiring additional mitigation, unless, within the specified sixty-day period, the SERVICE DEMONSTRATES that extraordinary circumstances under section 24.0 exist. If such extraordinary circumstances are found to exist, the SERVICE shall provide the appropriate additional mitigation or other amendments in a timely manner and amend the ITP to include the affected species if appropriated funds are available. If appropriated funds are not available, the SERVICES shall use all lawful means, including soliciting nongovernmental sources of funds and other alternative methods of mitigation or amendment, to endeavor to achieve the appropriate additional mitigation and amend the ITP to cover the particular species.

25.2 Amendments to the Agreement. This Agreement may be amended only with the written consent of each of the PARTIES.

25.3 HCP Amendments. The HCP may be amended as follows:

a. Minor HCP Amendments.

(1) The following types of minor amendments may be made to the HCP without notification, provided that the conservation objectives of the HCP are being maintained, there is no increase in the level of incidental take, and appropriate mitigation is provided. Amendments allowable under this subsection include the following:

(a) land acquisition and disposition as described in section 17.0, which provides for periodic notice and review of DNR land transactions involving PERMIT LANDS;

(b) corrections of typographic and grammatical errors and similar editing errors, which do not change the intended meaning of the HCP; and

(c) corrections to any maps, GIS data, or exhibits to reflect previously approved changes in the HCP or other new information.

(2) So long as appropriate mitigation is provided, the alteration of an HCP commitment or commitments, the formal designation of urban lands pursuant to state law, and the leasing of PERMIT LANDS for commercial, residential, or industrial purposes, or the implementation of one or more of the adaptive management strategies described in Chapter IV of the HCP or subsection 24.5 of this Agreement, that does not increase the level of take authorized by the ITP is a minor amendment effective sixty (60) DAYS after the SERVICES receive written notice

from DNR, unless the appropriate SERVICE responds in writing with specific concerns during the sixty-day notification period.

b. Major HCP Amendments. For other amendments of the HCP, including those amendments that would increase the level of take, proposed by DNR, DNR shall provide a written description of the proposed amendment, the effects of the proposal on the HCP, and any alternative ways in which the objectives of the proposal might be achieved. The proposed amendments shall become effective upon written approval by the appropriate SERVICE. The SERVICE shall approve or disapprove the proposed amendment within 180 DAYS after receipt of the DNR proposal.

c. HCP Amendments and the ITP. HCP amendments that will result in an increased level of incidental take will require amendment to the ITP under subsection 25.1.a of this Agreement. HCP amendments that do not increase the level of incidental take will not require amendment to the ITP under subsection 25.1.a of this Agreement so long as appropriate mitigation is provided.

26.0 ITP Suspension or Revocation. The SERVICES maintain the right to suspend or revoke the ITP in accordance with federal law and this Agreement. The SERVICES agree, however, that so long as DNR is in COMPLIANCE with the HCP, the ITP, and this Agreement, they will not suspend or revoke the ITP, or otherwise sanction DNR except to the extent that the sanction, suspension, or revocation of the ITP is required by applicable federal law or the terms of this Agreement. Any revocation of the ITP, in whole or in part, automatically terminates the relevant commitments of the HCP and this Agreement, and subjects activities no longer covered by the ITP to all applicable provisions of the ESA and SERVICE regulations relating to the taking of a listed species. If federal regulations should be modified from those codified at 50 C.F.R. §§ 13.26-13.29, and/or § 222.27, as of the effective date of this Agreement, the modified regulations will apply only to the extent the modifications are required by subsequent enactment of the Congress or court order, or upon a determination by DNR that application of the modifications is in the best interests of the relevant trusts.

27.0 Termination and Mitigation after Termination.

27.1 Generally. DNR reserves the right to terminate for any reason the HCP and this Agreement with thirty (30) DAYS written notice to the SERVICES. For listed species, the written termination notice shall contain a statement describing the species taken, the level of take, and the species mitigation provided prior to termination. DNR management activities not resulting in incidental take may continue after termination. Unlisted species are treated in subsection 27.5. The PARTIES agree that DNR may terminate the HCP and this Agreement in whole, or in part.

27.2 Effect of Termination. Subject to the provisions of this section and subsection 29.1 of this Agreement, any termination of the HCP and this Agreement, in whole or in part by DNR under section 27, automatically terminates the relevant commitments of the HCP, the ITP and this Agreement, except as otherwise provided in this section 27, and subjects activities no longer covered by the ITP to all applicable provisions of the ESA and SERVICE regulations relating to the taking of a listed species.

27.3 Mitigation After Termination for listed species. Subject to the provisions of subsection 29.1, if the HCP and this Agreement are terminated by DNR, in whole or in part, the appropriate SERVICE may require DNR to mitigate any incidental take of a listed species affected by the termination that occurred during the term of the HCP and this Agreement to the effective date of the termination. Such mitigation may require DNR to continue relevant mitigation measures of the HCP as to some or all of the PERMIT LANDS for some or all of the period which would have been covered by the HCP and this Agreement. The SERVICES shall not extend mitigation requirements to non-PERMIT LANDS, nor shall mitigation requirements be extended beyond the term of this Agreement. Mitigation requirements, if any, shall not exceed the difference between mitigation already provided under the HCP and that required by the HCP for listed species at the time of termination. Unlisted species are treated in subsection 27.5.

27.4 Delisting of a Species. In the event that a species is delisted under the ESA, the commitments of the HCP and this Agreement regarding such species shall be terminated. Mitigation measures designed primarily to benefit the delisted species need not be continued after delisting due to another species unless the appropriate SERVICE DEMONSTRATES that failure to continue those measures would not maintain the conservation objectives of the HCP for the other species, or DNR determines that continuation of such measures is in the best interest of the relevant trusts. The SERVICES shall have the burden of DEMONSTRATING that failure to continue the measures in question would not maintain the conservation objectives of the HCP for another species.

27.5 Unlisted Species. The PARTIES agree that DNR may terminate, in whole or in part, the commitments of the HCP and this Agreement regarding unlisted species upon seventy-five (75) DAYS written notice to the SERVICES. Termination of the commitments of the HCP with regard to an unlisted species relieves the SERVICES from their obligations under subsection 25.1.b to add the species to the ITP if it becomes listed.

Within said seventy-five (75) DAYS the SERVICES shall notify DNR in writing if they will require any mitigation as a result of such termination and, if so, the mitigation to be required. In order to require any mitigation after termination, the SERVICES shall DEMONSTRATE that termination would result in a substantial and material adverse change in the biological status of the affected species. Said DEMONSTRATION shall be based upon reliable, PEER REVIEWED technical information as to the species affected by the proposed termination.

To DEMONSTRATE whether the termination might warrant mitigation after termination and what mitigation might be required, the SERVICES shall consider, but not be limited to, the following factors:

(a) the size of the current range of the affected species;

(b) the percentage of range adversely affected by the termination of the HCP;

(c) the percentage of range conserved by the HCP;

(d) the ecological significance of that portion of the range affected and conserved by the HCP;

(e) the level of knowledge about the affected species and the mitigation provided to the species under the HCP; and

(f) whether the HCP was originally designed to provide an overall net benefit to the affected species.

During the said seventy-five (75) DAYS, DNR will use its best efforts to avoid a substantial and material adverse change in the status of the affected unlisted species. If the PARTIES are unable to agree on the necessity for or the amount of such mitigation, the SERVICES and DNR shall work to resolve any such dispute by using the interagency science team and non-binding mediation provisions under subsection 29.4 prior to final determination. The SERVICES shall not extend mitigation requirements to non-PERMIT LANDS, nor shall mitigation requirements be extended beyond the term of this Agreement. Requirements for such mitigation, if any, shall not exceed the difference between mitigation already provided under the HCP and that required by the HCP for unlisted species at the time of termination.

After the PARTIES mutually agree on a final determination of the potential mitigation to be provided after termination, if any, as to an unlisted species, DNR shall send final notice of such termination, or withdraw the notice of termination. Final notice of termination for an unlisted species shall be effective thirty (30) DAYS after written notice to the SERVICES.

28.0 Authority, Remedies and Enforcement. Each of the PARTIES to this Agreement shall have all remedies available in equity or at law to enforce the commitments of the HCP, the ITP, and this Agreement including specific performance. No PARTY shall be liable for damages to any other PARTY or person for any breach of this Agreement, any performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement. The HCP, this Agreement, and the ITP shall be interpreted and administered in accordance with the ESA. Nothing contained in this Agreement is intended to unlawfully limit the authority or responsibility of the United States government or DNR to invoke penalties or otherwise fulfill their respective responsibilities as public agencies in accordance with law.

29.0 Informal Dispute Resolution Procedures.

29.1 Termination of the PERMIT. A SERVICE receiving a termination notice under section 27.0 of this Agreement shall notify DNR within sixty (60) DAYS after receipt of the notice if it disagrees with the statement of take or mitigation contained therein. Failure by a SERVICE to disagree with the statement of take or mitigation within sixty (60) DAYS shall constitute agreement with and approval of the statement. If the PARTIES cannot agree on the statement of take, or on necessary mitigation, if any, within sixty (60) DAYS after receiving the notice of disagreement, the PARTIES shall endeavor in good faith to resolve their disagreement through nonbinding mediation.

29.2 In the Event of a Possible Violation. If either SERVICE has reason to believe that DNR may have violated the commitments of the HCP, the ITP, or this Agreement, written notice must be provided to DNR regarding the specific provisions which may have been violated and the mitigation that the responsible federal agency proposes to correct the alleged violation. DNR will have sixty (60) DAYS from the date of receipt of notice, or such longer period of time as may be

mutually agreed upon, to respond. If the PARTIES cannot agree on the violation or necessary mitigation within thirty (30) DAYS after receiving DNR's response, the PARTIES shall endeavor in good faith to resolve their disagreement through nonbinding mediation.

29.3 Minor HCP Amendments Under Subsection 25.3.a(2). In the event that DNR receives timely notice from the appropriate SERVICE regarding a proposed minor HCP amendment under subsection 25.3.a(2), the proposed minor amendment shall not be effective and the PARTIES shall have thirty (30) DAYS from DNR's receipt of the notice within which to reach mutual agreement through discussion. DNR may convene an interagency science team to provide technical assistance on the disputed issue. If the issue is not resolved within the thirty (30) DAY time period, the PARTIES shall endeavor in good faith to resolve their disagreement through nonbinding mediation, unless an extension is mutually agreed upon by all PARTIES.

29.4 Scheduled Reviews. In the event that a dispute arises at one of the scheduled reviews under section 17.0 of this Agreement, the PARTIES shall have thirty (30) DAYS from receipt of the notice of disagreement to reach mutual agreement through discussion. DNR may convene an interagency science team to provide technical assistance on the disputed issue. If the issue is not resolved within the thirty (30) DAY time period, the PARTIES shall endeavor in good faith to resolve their disagreement through nonbinding mediation, unless an extension is mutually agreed upon by all PARTIES. For land transactions not discussed at the scheduled reviews referenced above, the PARTIES shall endeavor to reach mutual agreement through discussion; the convening of an interagency science team by DNR or other dispute resolution procedures described above will not occur until a scheduled review, absent mutual consent of the PARTIES.

29.5 Other Disputes. In the event of other significant disputes involving the HCP, the ITP, or this Agreement, any PARTY shall provide the other PARTIES with a written notice of disagreement. Within thirty (30) DAYS of receiving the notice of disagreement, the PARTIES shall endeavor in good faith to resolve the dispute through nonbinding mediation.

29.6 Termination of Mediation. Nothing in this Agreement shall prevent any PARTY from terminating nonbinding mediation at any time and seeking any remedy or enforcement procedure available by law or regulation.

30.0 General Provisions.

30.1 No Partnership. Except as otherwise expressly set forth herein, neither the commitments of the HCP, the ITP, nor this Agreement shall make or be deemed to make any PARTY to this Agreement the agent for or the partner of any other PARTY.

30.2 Not a Covenant Running With the Land. Neither the HCP, ITP, or this Agreement shall be construed to establish a covenant that runs with the land.

30.3 Severability. If any of the commitments of the HCP, the ITP, or this Agreement are found to be invalid or unenforceable, or this Agreement is terminated in part, all other commitments shall remain in effect to the extent they can be reasonably applied in the absence of such invalid, unenforceable, or terminated commitment or commitments.

30.4 Congressional Officials Not to Benefit. No member of or delegate to Congress shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

30.5 Availability of Funds. Implementation and ongoing adherence to the HCP and this Agreement by all PARTIES shall be subject to the availability of appropriated funds. Failure by DNR to ensure adequate funding to implement the HCP shall be grounds for suspension or partial suspension of the ITP.

30.6 No Third Party Contract Beneficiaries. The commitments of the HCP, the ITP, and this Agreement are not intended to create, and do not create, any third-party beneficiary interest herein in the public or in any member thereof, nor shall it authorize anyone not a PARTY to this Agreement to maintain a suit based in whole or in part on any provision of this Agreement, the HCP, or ITP. The rights of the public under the ESA are set forth in 16 U.S.C. §1540(g) and nothing in this Agreement expands or otherwise alters the rights of citizens thereunder.

30.7 Counterparts. This Agreement may be executed in counterparts with each copy constituting an original. A complete original of this Agreement shall be maintained in the official records of each of the PARTIES hereto.

30.8 Entire Agreement. This Agreement supersedes any and all other agreements, either oral or in writing, among the PARTIES hereto with respect to the subject matter hereof, and contains all of the covenants and agreements among them with respect to said matters except for The 1979 Cooperative Agreement for Endangered Plants and The Agreement for Establishment and Operation of the Washington Cooperative Fish and Wildlife Research Unit. Further, each PARTY to this Agreement acknowledges that no representation, inducement, promise, or agreement has been made by another PARTY or anyone acting on behalf of another PARTY that is not embodied herein.

30.9 Contents Not Binding in Other Litigation. The contents of the HCP, ITP, and this Agreement shall not be construed as statements against interest or admissions and are not binding in litigation except in matters related to enforcement by the PARTIES of the HCP, ITP, and this Agreement. In addition, DNR reserves the right to assert that its activities do not require an ITP.

31.0 Notices. The names, addresses, and telephone and facsimile numbers of the designated representatives may be changed at any time by written notice to the other PARTIES. Notices under this Agreement will be deemed received when delivered personally, on electronic confirmation that a facsimile message has been received at the "FAX" number most recently provided by the recipient representative, or five (5) DAYS after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as above.

32.0 Designated Representatives. Each PARTY to this Agreement will designate a representative through whom notices under this Agreement shall originate and to whom notices under this Agreement shall be directed. The initial designated representatives are:

for DNR: Department of Natural Resources Administrator
Washington State Department of Natural Resources
1111 Washington Street S.E.
P.O. Box 47000
Olympia, Washington 98504-7000
Telephone: (360) 902-1000
FAX: (360) 902-1796

for USFWS: Assistant Regional Director
United States Fish and Wildlife Service
911 N.E. 11th Avenue
Portland, Oregon 97232-4181
Telephone: (503) 231-6159
FAX: (503) 872-2771

for NMFS: Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way N.E.
Seattle, Washington 98115-0070
Telephone: (206) 526-6150
FAX: (206) 526-6426

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Implementation Agreement to be in effect as of the date last signed below.

WASHINGTON DEPARTMENT OF NATURAL RESOURCES
including THE BOARD OF NATURAL RESOURCES

Date 1/30/97

JENNIFER M. BELCHER
Commissioner of Public Lands

Approved as to form this 30th day of January, 1997,

Paul A. Silver, Senior Assistant Attorney General

UNITED STATES DEPARTMENT OF THE INTERIOR
through the U.S. FISH AND WILDLIFE SERVICE

Date 1/30/97

MICHAEL J. SPEAR
Regional Director

UNITED STATES DEPARTMENT OF COMMERCE
through the NATIONAL MARINE FISHERIES SERVICE

Date 1/30/97

WILLIAM W. STELLE, Jr.
Regional Administrator

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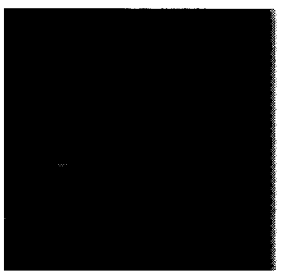

Glossary

Glossary

Active channel - Defined by DNR as the stream area occupied by typical flood events (i.e., comparable to the two-year recurring flood). The active channel generally coincides with the ordinary high-water mark.

Age class - An interval, commonly 10 years, into which the age range of forest stands is divided for classification.

Anadromous fish - Those species of fish that mature in the ocean and migrate to freshwater rivers and streams to spawn; an example is salmon.

Aquatic zone - The location of aquatic ecosystems within the riparian ecosystem, as defined in the HCP.

Blowdown - Trees felled by high wind.

Board of Natural Resources - A Washington State board that establishes policies for the Department of Natural Resources to ensure that the acquisition, management, and disposition of lands and resources within DNR's jurisdiction are based on sound principles. The board is composed of six members: The Commissioner of Public Lands, the Governor, the Superintendent of Public Instruction, the dean of the College of Agriculture at Washington State University, the dean of the College of Forest Resources at the University of Washington, and an elected representative from a county that contains Forest Board land.

Bog - A hydrologically isolated, low nutrient wetland that receives its water from precipitation only. Bogs typically have no inflow and rarely have outflows. Bogs have peat soils 16 or more inches in depth (except where over bedrock), and specially adapted vegetation such as sphagnum moss, Labrador tea, bog laurel, sundews, and some sedges. Bogs may have an overstory of spruce, hemlock, cedar, or other tree species, and may be associated with open water.

Buffer - A forested strip left during timber harvest to conserve sensitive ecosystems or wildlife habitat. Management activities may be allowed as long as they are consistent with the conservation objectives for the buffer.

Candidate species - A federal and state designation for species that are being considered for listing. Federal candidate species, category 1, are species for which there is substantial information to support listing the species as threatened or endangered; listing proposals are either being prepared or are delayed. Federal candidate species, category 2, are species for which information indicates that listing may be appropriate, but conclusive data are not available; additional information is being collected. State candidate species are those that the Washington Department of Fish and Wildlife will review for possible listing as endangered, threatened, or sensitive. Federal candidate species are examined

individually to determine their status in Washington and whether inclusion as a listed species is appropriate or warranted.

Canopy - The continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth. See also "Understory canopy" and "Overstory canopy."

Canopy closure - The degree to which the canopy (forest layers above one's head) blocks sunlight or obscures the sky. See also "Relative density."

Clearcut - A harvest method in which all or almost all of the trees are removed in one cutting; an even-aged silvicultural system. Clearcutting establishes a stand without protection from an overstory canopy.

Climax - The culminating, highly stable stage in plant succession for a given environment; an ecosystem will stay at the climax stage until disturbance affects the ecosystem and the stages of ecological succession begin again.

Cluster - An area that contains habitat capable of supporting three or more breeding pairs of spotted owls with overlapping or nearly overlapping home ranges.

Coarse woody debris - See "Large woody debris."

Code of Federal Regulations (CFR) - A codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the federal government.

Commercial thinning - The removal of generally merchantable trees from an even-aged stand, so that the remaining trees can develop faster and with less competition.

Critical habitat, federal - Areas designated under the federal Endangered Species Act that have the physical and biological features necessary for the conservation of a listed species and that require special management.

Critical habitat, state - Habitats of threatened or endangered species as designated by the Washington Forest Practices Board.

Debris avalanches - The very rapid and usually sudden sliding and flowage of loose, unsorted mixtures of soil and weathered bedrock.

Debris flow - A moving mass of rock fragments, soil, and mud, more than half the particles being larger than sand size; can travel many miles down steep confined mountain channels; a form of debris torrent.

Debris torrent - Debris flow or dam-break flood. Rapid movement of a large quantity of materials, including wood and sediment, down a stream channel. Usually occurs in smaller streams during storms or floods, and scours the stream bed.

Demographic support - The reproductive contributions of individuals which enhance population viability.

Diameter at breast height (dbh) - The diameter of a tree, measured 4.5 feet above the ground on the uphill side of the tree.

Direct influence zone - The area in uplands, bordering the riparian zone, that has a direct influence on aquatic ecosystems. Direct influences include shading, sedimentation, input of organic nutrients, and recruitment of large woody debris.

Dispersal - The movement of juvenile, subadult, and adult animals from one sub-population to another. For juvenile spotted owls, dispersal is the process of leaving the natal territory to establish a new territory.

Dispersal habitat, spotted owls (east-side planning units) - In DNR's HCP, dispersal habitat has the following characteristics: (1) canopy closure of at least 50 percent; (2) overstory tree density of at least 40 trees per acre that are at least 11 inches dbh; (3) top height of at least 60 feet; (4) retention of four green trees per acre from the largest size class present for recruitment of snags and cavity trees; and, (5) at least 50 percent of DNR-managed lands designated for dispersal function on a quarter township basis will be maintained in these stand conditions.

Dispersal habitat, spotted owls (west-side planning units) - Habitat used by juvenile owls or by owls of any age to disperse or move from one area of nesting-roosting-foraging habitat to another. In DNR's HCP, dispersal habitat will be maintained on 50 percent of lands selected for a dispersal habitat role. The 50 percent will be measured on a WAU basis. In the HCP, dispersal habitat has the following minimum characteristics: (1) canopy cover of at least 70 percent; (2) the largest trees in a stand should have a quadratic mean dbh of 11 inches; (3) a top canopy height of at least 85 feet (top height is the average height of the 40 largest diameter trees per acre); and, (4) green tree retention of at least four trees from the largest size class per acre. Type A, Type B, and sub-mature habitat can be counted as dispersal habitat.

Down woody debris - See "Large woody debris."

Draft Environmental Impact Statement (DEIS) - A public document prepared pursuant to the State or National Environmental Policy Acts (SEPA or NEPA).

Earthflow - A mass-movement landform and process characterized by downslope translation of soil and weathered rock over a discrete basal shear surface (landslide) within well defined lateral boundaries.

Edge - Where plant communities meet or where successional stages or vegetative conditions with plant communities come together.

Edge effects - The drastically modified environmental conditions along the margins, or "edges," of forest patches surrounded by partially or entirely harvested lands.

Effectiveness monitoring - Monitoring done to determine whether the HCP conservation strategies result in the anticipated habitat conditions.

Enabling Act - The Congressional Enabling Act of 1889, which authorized statehood for Washington. The act provided the state with Federal Grant lands to be held in trust for the support of the state's public institutions and placed limits on the sale, lease and management of these lands.

Endangered species - A federal and state designation. A species determined to be in danger of extinction throughout all or a significant portion of its range.

Endangered Species Act - The federal Endangered Species Act of 1973, as amended, sets up processes by which plant or animal species can be designated as threatened or endangered. Two federal agencies, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, administer the act. Once species are listed, the act also provides that these agencies develop recovery plans for these species, including conserving the ecosystems on which listed species depend.

Environmental impact statement (EIS) - A document prepared under the National and/or State Environmental Policy Acts to assess the effects that a particular action will have on the environment.

Evapotranspiration - The conversion of water, whether open or as soil moisture (both by evaporation) or within plants (by transpiration), into water vapor that is released to the atmosphere.

Even-aged - A system of forest management in which stands are produced or maintained with relatively minor differences in age; generally, less than a 10-year difference in age.

Evolutionarily Significant Units - A population that is substantially reproductively isolated from other population units of the same species, and represents an important component in the evolutionary legacy of the species.

Exterior riparian buffer - A buffer whose purpose is to protect the integrity of the interior-core buffer; part of the OESF riparian strategy. See also "Buffer."

Extirpation - The elimination of a species from a particular area.

Federally listed - Species formally listed as a threatened or endangered species under the federal Endangered Species Act; designations are made by the U.S. Fish and Wildlife Service or National Marine Fisheries Service.

Federal Reanalysis Team - A group of six federal scientists assembled to review existing data and develop a population model to estimate the importance of contributions of varying amounts of habitat from nonfederal lands to the long-term existence of a spotted owl population on the Olympic Peninsula.

Federal reserves - Federal lands that have been, or are proposed to be, withdrawn from acreage used for timber yields. These include Congressional Reserves such as national parks, wild and scenic rivers, national recreation areas, national monuments, and wilderness; Late-Successional Reserves, Riparian Reserves, Administratively Withdrawn Areas, Research Natural Areas, Special Recreation Management Areas, etc.

50-11-40 guideline- The Interagency Scientific Committee's recommendation that forested federal lands between designated Habitat Conservation Areas be managed such that 50 percent of every quarter township have forest stands in which trees have an average dbh of 11 inches and at least a 40 percent canopy closure.

Forest ecosystem - The interrelationships between the various trees and other organisms (both plants and animals) that form a community; and the interrelationships between these organisms and the physical environment in which they exist.

Forest Ecosystem Management Assessment Team (FEMAT) - A team organized by the federal government in 1993 to develop a management plan for federal lands within the range of the northern spotted owl.

Forest Practices Act - A Washington State statute establishing minimum standards for forest practices and providing for necessary administrative procedures and rules applicable to activities conducted on or pertaining to forests on both state-managed and private lands.

Forest Practices Board - A Washington State board created to write forest practices rules which are administered and enforced by the Washington Department of Natural Resources.

Forest Resource Plan - DNR's Forest Land Management Division's 1992 final policy plan, containing the current policies of the Board of Natural Resources.

Forest stand - See "Stand."

Fragmentation - The spatial arrangement of successional stages across the landscape as the result of disturbance; often used to refer specifically to the process of reducing the size and connectivity of late successional or old-growth forests. Fragmentation of existing habitat increases the accessibility of nest sites to predators and isolates portions of the population.

Geographic information system (GIS) - A computer system that stores and manipulates spatial data, and can produce a variety of maps and analyses. DNR's GIS is able to (1) assign information and attributes to polygons and lines, which represent relationships on the ground; and, (2) update and retrieve inventory, mapping, and statistical information. DNR uses its GIS as one of several tools for setting landscape-level planning objectives.

Geomorphic processes - Landscape-modifying processes such as erosion, mass wasting, and stream flow.

Green tree retention - A stand management practice in which live trees are left within harvest units to provide habitat components.

Habitat complexity - As defined in the HCP OESF riparian conservation strategy, habitat complexity includes (1) variations in stream flow velocity and depth by structural obstructions to channel flow; (2) physical and biological interactions between a channel and its floodplain; (3) aquatic and riparian structures that provide cover from predators; (4) a variety of stream substrates that include gravel for fish spawning and macroinvertebrate habitat; (5) sufficient storage area within channels and floodplains for sediment and organic matter; and, (6) diversity of riparian vegetation that provides adequate sources of woody debris and nutrients to channels, and that moderates water and air temperatures within the riparian corridor.

Habitat conservation plan (HCP) - An implementable program for the long-term protection and benefit of a species in a defined area; required

as part of a Section 10 incidental take permit application under the federal Endangered Species Act.

Habitat preference - The choice of habitat(s) that the animal would make if all habitat types were available to it.

Habitat selection - The choice of a habitat(s) directly available to the animal.

Harm - A form of take under the federal ESA; defined in federal regulations as an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation where it actually kills wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3).

High quality nesting habitat, spotted owls (five west-side planning units) - An interim definition developed in DNR's HCP, to be applied as an average condition over a 300-acre nesting habitat patch. High quality nesting habitat consists of (1) at least 31 trees per acre greater than or equal to 21 inches dbh per acre; (2) at least three trees from the above group of 31 trees have broken tops; (3) at least 12 snags per acre greater than 21 inches dbh; (4) a minimum of 70 percent canopy closure; and, (5) a minimum of 5 percent ground cover of large down woody debris.

Home range - The area used by a species and to which it exhibits fidelity. There is much geographic variation in spotted owl home range size. The median home range (determined by USFWS radio telemetry data) is a circle 1.8 miles in radius east of the I-5 corridor, or a circle 2.7 miles in radius west of the I-5 corridor. Hanson et al. (1993) determined that the median range radius for owls in the western Washington Cascades is 2.0 miles. Researchers have observed median home ranges of 14,232 acres on the Olympic Peninsula and 6,609 acres in the eastern Cascades. (See Chapter III of the HCP for more discussion.)

Hydrologic analysis unit (HAU) - Subdivisions of the Watershed administrative unit (WAU) used in the Washington Forest Practices Board's watershed analysis manual 'Hydrology Module.'

Hydrologic maturity - The degree to which hydrologic processes (e.g., interception, evapotranspiration, snow accumulation, snowmelt, infiltration, runoff) and outputs (e.g., water yield and peak disharge) in a particular forest stand approach those expected in a late seral stand under the same climatic and site conditions. In DNR's HCP, a "hydrologically mature forest," with respect to rain-on-snow runoff, is a well-stocked conifer stand at age 25 years or older.

Identifiable channel - A river or stream channel with well-defined and measurable channel banks where vegetative ground cover has been disturbed and sediment is exposed.

Implementation Agreement (IA) - A part of the application for an incidental take permit, which specifies the terms and conditions, resources, schedule of activities, and expectations for the parties to the agreement.

Implementation monitoring - Monitoring done to determine whether the HCP conservation strategies are implemented as written.

Incidental take - The taking of a federally listed wildlife (animal) species, if the taking is incidental to, and not the purpose of, carrying out otherwise lawful activities. See also "Take."

Incidental take permit - Permit issued by the U.S. Fish and Wildlife Service to either a private entity or a state, that allows incidental take of a threatened or endangered species; permit also requires permitee to carry out specified actions that minimize and mitigate the incidental take, and may contribute to the recovery of the species.

Interior-core riparian buffer - Streamside buffer in the HCP OESF riparian strategy; minimizes disturbance of unstable channel banks and adjacent hillslopes, and protects and aids natural restoration of riparian processes and functions. See "Buffer."

Landscape - Large regional units of lands that are viewed as a mosaic of communities, or a unit of land with separate plant communities or ecosystems forming ecological units with distinguishable structure, function, geomorphology, and disturbance regimes. In DNR's HCP, a landscape is defined as a large area comprised of various interacting patterns of stand structure and function going through alterations over time.

Landscape assessment - In DNR's HCP, any method to field verify the amount of habitat in WAUs on DNR-managed lands.

Landscape-level planning - The process of planning across a larger area than stand by stand.

Landscape planning - The process of planning for a specified landscape by setting specific objectives for a given area, such as protection of wildlife and timber production.

Landscape planning unit - Landscape-level planning units used by DNR's Olympic Region to identify 11 watershed-based units within the Olympic Experimental State Forest.

Landslide - Any mass movement process characterized by downslope transport of soil and rock, under gravitational stress, by sliding over a discrete failure surface; or the resultant land form. In forested watersheds, landsliding typically occurs when local changes in the soil pore water pressure increase to a degree that the friction between soil particles is inadequate to bind them together.

Large saw - Large sawtimber. DNR's GIS forest classification for large saw is: dominant dbh 20-30 inches; more than 10 dominant trees/acre of this size; co-dominant trees are 14 inches dbh or greater; two or three canopy layers more closed than old growth; small snags present with sparse or no large snags; few large down logs.

Large woody debris - Large pieces of wood in stream channels or on the ground - includes logs, pieces of logs, and large chunks of wood; provides streambed stability and/or habitat complexity. Also called coarse woody debris or down woody debris. Large organic debris is large woody debris, but may contain additional non-woody debris, such as animal carcasses.

Late successional forest - A mature and/or old-growth forest stand. Also called late seral stage forest. Typical characteristics are moderate to

high canopy closure, a multi-layered, multispecies canopy dominated by large overstory trees, numerous large snags, and abundant large woody debris (such as fallen trees) on the ground. Typically, stands 80-120 years old are entering this stage.

Layered - A transitional forest structure, when second-growth is being manipulated to create old growth features; there is greater structural diversity than understory and somewhat less than with classic old growth.

Leeward - In this document, the side of a stream opposite that from which the wind blows.

Listed wildlife species - Species formally listed as endangered, threatened, or sensitive by a federal (USFWS or NMFS) or state (WDFW) agency.

Low-harvest area - As defined for the HCP's west-side planning units, the outermost portion of the riparian buffer, more than 100 feet from the active channel margin.

Low order streams - Small streams with very few tributaries; often are headwaters. Type 4 and 5 waters are low order streams.

Maintenance and Enhancement Phase - In the HCP OESF strategy, the remainder of the permit period following the restoration of threshold amounts of total spotted owl habitat (40 percent) in all Landscape planning units. This phase follows the Restoration Phase.

Maintenance of species distribution - Supporting the continued presence of a species in as much of its historic range as possible.

Marbled murrelet - A Pacific seabird that nests in mature or old-growth forests within 50 miles of the marine environments; listed as a threatened species by the U.S. Fish and Wildlife Service and Washington State.

Marbled murrelet habitat - For marbled murrelets, potential habitat is coniferous forests within 50 miles of the coast; old growth regardless of stand size; mature forests (80-200 year old stands) with or without an old growth component; young stands with remnant old growth or mature trees greater than 32 inches in diameter; young (70-80 years) coniferous forests that have deformities that result in structures suitable for nesting. Marbled murrelet habitat requires structural features such as large residual trees, large limbs, and nesting platforms.

Mass wasting - Dislodgment and downslope transport of soil and rock under the direct application of gravitational stress, i.e., without major action of water, wind, or ice.

Matrix - As proposed by FEMAT, the matrix is the area of federal lands where most timber harvest will occur, in the areas outside of the Late-Successional Reserves and Riparian Reserves.

Mature stand - The period of life in a forest stand from culmination of mean annual increment to an old-growth stage or to 200 years. This is a time of gradually increasing stand diversity. Hiding cover, thermal cover, and some forage may be present.

Metapopulation - Several sub-populations linked together by immigration and emigration. Metapopulation dynamics are influenced by the relationships between source and sink habitats and source and sink sub-populations.

Minimal-harvest area - As defined for the HCP's west-side planning units, the part of the riparian buffer outside of the no-harvest area; the next 75 feet from the active channel, and inside the low-harvest area (25-100 feet from the stream).

Mitigation - Methods of reducing adverse impacts of a project, by (1) limiting the degree or magnitude of the action and its implementation; (2) rectifying the impact by repairing, rehabilitating, or restoring the affected environment, (3) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, or, (4) compensating for the impact by replacing or providing substitute resources or environments.

Monitor species - A state designation. Wildlife species native to the state of Washington that: (1) were at one time classified as endangered, threatened, or sensitive; (2) require habitat that has limited availability during some portion of its life cycle; (3) are indicators of environmental quality; (4) require further field investigations to determine population status; (5) have unresolved taxonomy which may bear upon their status classification; (6) may be competing with and impacting other species of concern; or, (7) have significant popular appear.

National Environmental Policy Act (NEPA) - NEPA requires all federal agencies to consider and analyze all significant environmental impacts of any action proposed by those agencies; to inform and involve the public in the agency's decision-making process; and to consider the environmental impacts in the agency's decision-making process.

National Marine Fisheries Service (NMFS) - The federal agency that is the listing authority for marine mammals and anadromous fish under the Endangered Species Act.

Natural Area Preserve (NAP) - In Washington State, a natural area which has been so dedicated under the provisions of state law, or formally committed to protection by a cooperative agreement between a government landholder and the Department of Natural Resources.

Natural Heritage Program - A DNR program that identifies, selects and nominates outstanding natural areas in Washington; also, oversees state listing of plants.

Natural Resources Conservation Area (NRCA) - Washington State lands designated by the legislature to protect special scenic and/or ecological values.

Nest patches - Patches of old forest with a high degree of structural complexity (i.e., forest types known to support nesting spotted owls) that will be retained in an unmanaged state during the research phase of the HCP; part of the west-side NRF management strategy.

Nesting platform, marbled murrelet - Any large limb or other structure at least 50 feet above ground and at least 7 inches in diameter. In DNR's HCP, platforms are counted in conifer trees only, and only if located within the live crown.

Nesting, roosting, and foraging habitat (NRF) - Habitat with the forest structure, sufficient area, and adequate food source to meet the needs of a nesting pair of spotted owls. The forest structure consists of stands at least 70 years old that include a three-layer canopy of very large diameter trees (200+ years old) from the previous stand, large diameter trees (70+ years old), and small understory trees, along with snags and large down woody debris.

No-harvest area - As defined for the HCP's west-side planning units, the 25 feet of the riparian buffer closest to the stream.

Northern spotted owl - A medium-size dark brown owl that has round to elliptical white spots on the head, white mottling on the body and abdomen, and white bars on the tail; native to the Pacific coastal region. Federally listed as a threatened species, and listed as endangered by Washington State.

NRF management areas - Lands identified in DNR's HCP that will be managed to provide demographic support and contribute to maintaining species distribution for the spotted owl. Also called NRF areas.

Old-growth forest - A successional stage after maturity that may or may not include climax old-growth species; the final seral stage. Typically, contains trees older than 200 years. Stands containing Douglas fir older than 160 years, which are past full maturity and starting to deteriorate, may be classified as old growth. DNR's GIS forest classification for old growth is: a dominant dbh of 30 inches or greater; usually more than eight dominant trees/acre; three or more canopy layers with less than complete canopy closure; several snags/acre with a 20 inch dbh or greater; and several down logs per acre with a 24 inch dbh or greater.

Olympic Experimental State Forest (OESF, the Experimental Forest) - A DNR planning unit on the Olympic Peninsula, which has unique potential for research and experiments involving forestry, wildlife, and related disciplines; an integral part of DNR's HCP.

Orographic - Pertaining to mountains, especially in regard to their location, distribution, and accompanying phenomenon; also, said of the precipitation that results when moisture-laden air encounters a high barrier and is forced to rise over it, such as the precipitation on the windward slopes of a mountain range facing a steady wind from a warm ocean.

Overstory canopy - The uppermost forest canopy layer. See also "Canopy" and "Understory canopy."

Owl circle - A radius that approximates the median spotted owl home range size. See also "Home range."

Packing - An increased density of birds nesting in the habitat that is available.

Partial cutting - Removal of selected trees from a forest stand, leaving an uneven-aged stand of well-distributed residual, healthy trees. Also called uneven-aged management.

Patch - See "Nest patches."

Physiographic province - A region of which all parts are similar in

geologic structure and climate and which consequently had a unified geomorphic history; a region whose pattern of relief features or landforms differs significantly from that of adjacent regions.

Planning unit - DNR-managed land units, grouped into three blocks for the purpose of implementing the HCP: the Olympic Experimental State Forest, five west-side planning units, and three east-side planning units. The nine planning units in the HCP area are: Olympic Experimental State Forest, South Coast, North Coast, Columbia, Straits, South Puget, Chelan, Yakima, and Klickitat.

Pole - Any considerable length of round timber before saw log size, ready for use without further conversion. DNR's GIS classification for pole is: dominant dbh 10-14 inches; one canopy layer; and, little or no down dead woody debris.

Population dynamics - How populations and the environment interact to cause changes in a population over time.

Population viability analysis - Using population dynamics to analyze how large a population needs to be and how its habitat needs to be distributed across landscapes to persist over time. See also "Viable population."

Precommercial thinning - Cutting trees at an immature age to allow for better growth of the remaining trees; may include removal of excess and/or diseased trees in the 10-35 year class.

Proposed threatened or endangered species - Species proposed by the USFWS or NMFS for listing as threatened or endangered under the Endangered Species Act; not a final designation.

Rain-on-snow zone - Area, generally defined as an elevation zone, where it is common for snowpacks to be partially or completely melted during rainstorms several times during the winter.

Recovery plan - A plan developed by a government agency, that if implemented is expected to result in the recovery of a threatened or endangered species to the extent that the species can be delisted from threatened or endangered status.

Relative density (RD) - The basal area of a stand divided by the square root of the quadratic mean dbh of the stand. In the HCP, when canopy closure is used in a habitat definition, RD will be used as a measurement if and when DNR has established a correlation between RD and canopy closure in spotted owl habitats for its lands.

Reserves - See "Federal reserves."

Restoration Phase - In the HCP OESF strategy, the 40-60 year period during which existing young stands are developing the characteristics of young forest marginal and sub-mature habitat.

Revised Code of Washington (RCW) - A revised, consolidated, and codified form and arrangement of all the laws of the state of a general and permanent nature.

Riparian buffer - As defined for the HCP's west-side planning units, the

inner buffer of the riparian management zone that serves to protect salmonid habitat. See "Riparian management zone."

Riparian ecosystem - In DNR's HCP, the area of direct interaction between terrestrial and aquatic environments.

Riparian management zone - Defined in DNR's Forest Resource Plan (1992) Policy No. 20, and refined in DNR's HCP, an area consisting of an inner riparian buffer and an outer wind buffer. The riparian buffer serves to protect salmonid habitat; the wind buffer protects the riparian buffer. This policy expands the level of protection required under the current Forest Practices Act and authorizes DNR to establish riparian protection zones along Type 1 through 4 waters and, when necessary, along Type 5 waters. DNR may remove timber from riparian management zones if adequate protection can be provided to fish and other nontimber resources. These riparian management zones apply to the west-side planning units.

Riparian zone - A narrow band of moist soils and distinctive vegetation along the banks of lakes, rivers, and streams; in the HCP, the portion of the riparian ecosystem between the aquatic zone and the direct influence zone (uplands).

River mile - A statute mile as measured along the center line of a river. River miles are measured from the mouth of the river, or are discrete measures of distance (i.e., a distance of 2-4 river miles).

Salmonids - Fish species belonging to the family Salmonidae, including trout, salmon, char, and whitefish species.

Sapling - A young tree no longer a seedling but not yet a pole. DNR's GIS classification for sapling is: approximately 2-5 inches dbh.

Seed tree harvest - A harvest method in which all mature timber from an area is harvested in one entry except for a small number of trees left as a seed source for the harvested area.

Selective harvest - A general term for partial cutting or salvage cutting in which individual trees are removed.

Sensitive species - A state designation. State sensitive species are species native to the state of Washington that are vulnerable or declining and are likely to become endangered or threatened in a significant portion of their ranges within the state without cooperative management or the removal of threats.

Shelterwood cut - A harvest method in which a portion of a mature forest stand is removed in two or more cuttings; a portion of the stand is retained as a source of seed and/or protection during the period of regeneration.

Silviculture - The theory and practice of controlling the establishment, composition, growth, and quality of forest stands in order to achieve management objectives.

Sink area - The area in which local mortality rate exceeds local reproductive rate. Because mortality rates exceed reproduction, these populations would go extinct without immigration from source areas.

Site center - The actual nest tree or the primary roost of territorial owls.

Site index - A measure of forest productivity expressed as the height of the dominant trees in a stand at an index age.

Site index curves - Nonlinear regressions of tree height versus breast height age for different site productivities; used as a means to predict future growth.

Site potential tree height - The height a dominant tree may attain, given site conditions where it occurs.

Slump - A landslide characterized by a shearing and rotary movement of a generally independent mass of rock or earth along a curved slip surface (concave upward) and about an axis parallel to the slope from which it descends, and by backward tilting of the mass with respect to that slope so that the slump surface often exhibits a reversed slope facing uphill.

Small saw - Small sawtimber. DNR's GIS forest classification for small saw is: dominant dbh 14-20 inches; one or two canopy layers; small snags or none present; and, small down dead wood or none present.

Snag - Dead tree that is still standing.

Source area - The area in which local reproductive success is greater than local mortality (lambda is greater than one at the scale of an owl cluster). Populations in source areas produce an excess of individuals that must emigrate from their natal area to establish new territories.

Special Emphasis Areas - Proposed federally designated areas in Washington, as outlined in the draft 4(d) rule under the ESA.

Spotted owl - See "Northern spotted owl."

Spotted owl site status - See "Status 1 through 5, spotted owl site centers."

Stand - A group of trees that possess sufficient uniformity in composition, structure, age, spatial arrangement, or condition to distinguish them from adjacent groups.

Stand conversion - The conversion of stands from low-commercial value species to more valuable conifer species; also called stand rehabilitation.

Stand initiation - The first stage of forest growth; an open condition and new regeneration. The other three stages are stem exclusion, understory reinitiation, and old growth.

State Environmental Policy Act (SEPA) - This law is the basic state charter for protection of the environment. SEPA requires all state agencies to consider and analyze all significant environmental impacts of any action proposed by those agencies; to inform and involve the public in the agency's decision-making process; and to consider the environmental impacts in the agency's decision-making process.

Status 1 through 5, spotted owl site centers - Status assigned to spotted owl site centers by the Washington Department of Fish and Wildlife (WAC 222-16-080). The five categories are: Status 1- Pair or

reproductive; Status 2- Two birds, pair status unknown; Status 3- Resident territorial single; Status 4- Status unknown; and, Status 5- Historic status (formerly occupied).

Stem exclusion - The second stage of forest growth, with tree competition and mortality. The other three stages are stand initiation, understory reinitiation, and old growth.

Stream classifications - See "Water typing system."

Subalpine - The area above the upper limit of contiguous closed forest and beneath the upper limit of growth; typically, a mosaic of tree patches and meadows.

Sub-mature forest - DNR defines this as a younger forest category that includes mid-seral forest (non-late successional or old growth) that has the structural characteristics necessary to provide roosting and foraging functions.

Sub-mature habitat (east-side planning units) - In DNR's HCP, sub-mature habitat has the following characteristics: (1) forest community composed of at least 40 percent Douglas-fir or grand fir component; (2) canopy closure of at least 70 percent; (3) tree density of between 110-260 trees per acre; (4) tree height or vertical density with either (a) dominant and co-dominant trees at least 90 feet tall, and/or (b) two or more canopy layers, numerous intermediate trees, numerous low perches; (5) snags/cavity trees or mistletoe infection with either (a) three or more snags or cavity trees per acre that are equal to or greater than 20 inches dbh, and/or (b) a moderate to high infection of mistletoe; and (6) 5 percent ground cover of dead and down wood averaged over a stand.

Sub-mature habitat (west-side planning units) - In DNR's HCP, sub-mature habitat has the following characteristics: (1) forest community dominated by conifers, or in mixed conifer/hardwood forest, the community is composed of at least 30 percent conifers (measured as stems per acre dominant, co-dominant, and intermediate trees); (2) at least 70 percent canopy closure; (3) tree density of between 115-280 trees per acre (all greater than 4 inches dbh); (4) height of dominant and co-dominant trees at least 85 feet tall; (5) at least three snags or cavity trees per acre that are at least 20 inches dbh; and, (6) a minimum of 5 percent ground cover of large down woody debris.

Sub-population - A well-defined set of interacting individuals that comprise a proportion of a larger, interbreeding population.

Suitable habitat block, marbled murrelets - In DNR's HCP, a suitable habitat block is a contiguous forested area that is at least 5 acres in size, contains an average of at least two potential nesting platforms per acre, and is within 50 miles of marine waters.

Take - A prohibited action under federal law, except where authorized. To harass, harm, pursue, hunt, wound, kill, trap, capture, or collect a federally listed threatened or endangered species, or to attempt to do so (ESA, Section 3[19]). Take may include disturbance of the listed species, nest, or habitat, when disturbance is extensive enough to disrupt normal behavioral patterns for the species, although the affected individuals may not actually die. See also "Harm" and "Incidental take."

Talus - A homogeneous area of rock rubble, ranging in average size from 1 inch to 6.5 feet, derived from and lying at the base of a cliff or very steep, rocky slope.

Target conditions - Achieving ecological recovery and population restoration of a listed species; target conditions are often defined in federally-mandated recovery plans for a given species.

Taxon - A category in the biological system of arranging plants and animals in related groups, such as class, family, or phylum.

Threatened species - A federal and state designation as defined in the Endangered Species Act for species likely to become an endangered species throughout all or a significant portion of their range within the foreseeable future.

Threatened and endangered species - Formal classifications of species. Federal designations are made by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. State of Washington designations are made by the Washington Fish and Wildlife Commission (RCW 77.08.010). See also "Candidate species," "Endangered species," "Proposed threatened or endangered species," "Sensitive species," and "Threatened species."

Trust - In law, a fiduciary relationship in which one person (the trustee) holds the title to property or manages it for the benefit of another (the beneficiary).

Trust lands - Those lands held in trust and managed by the Washington Department of Natural Resources for the benefit of the trust beneficiaries.

Turbidity - The relative clarity of water, which may be affected by material in suspension in the water.

Types 1 through 5 streams or waters - See "Water typing system."

Underburning - Prescribed burning of the forest floor or understory for botanical or wildlife habitat objectives, hazard reduction, or silvicultural objectives.

Understory canopy - Forest undergrowth; the lowest canopy layer of trees and woody species. See also "Canopy" and "Overstory canopy."

Understory reinitiation - The third stage of forest growth, with undergrowth development and some tree regeneration. The other three stages are stand initiation, stem exclusion, and old growth.

Uneven-aged - Forests composed of trees that differ markedly in age. This results from partial cutting practices.

U.S. Fish and Wildlife Service (USFWS) - The federal agency that is the listing authority for species other than marine mammals and anadromous fish under the Endangered Species Act.

Unzoned forest - In DNR's HCP, a forest without areas deferred from timber management.

Validation monitoring - Monitoring done to evaluate the cause-and-effect relationships between habitat conditions resulting from the HCP conservation strategies and the animal populations these strategies are intended to benefit.

Vegetative zones - Broad areas that have similar types of vegetation. Zones within the HCP area include the Sitka spruce zone, the western hemlock zone, the Pacific silver fir zone, the subalpine fir/mountain hemlock zone, the alpine zone, the grand fir zone, the Douglas-fir zone, and the ponderosa pine zone (based on Franklin and Dyrness 1973).

Viability analysis - See "Population viability analysis."

Viable population - A population that is of sufficient size and distribution to be able to persist for a long period of time in the face of demographic variations, random events that influence the genetic structure of the population, and fluctuations in environmental conditions, including catastrophic events.

Washington Administrative Code (WAC) - All current, permanent rules of each state agency, adopted pursuant to chapter 34.05 RCW.

Washington Board of Natural Resources - See "Board of Natural Resources."

Washington Forest Practices Act - See "Forest Practices Act."

Washington Forest Practices Board - See "Forest Practices Board."

Washington Fish and Wildlife Commission - The state commission with statutory authority to list threatened, endangered, and sensitive species.

Water resource inventory area (WRIA) - Watershed-based planning unit, defined by the Washington State Department of Ecology. WRIAs are determined by drainages to common water bodies.

Water typing system - A simplified explanation of Washington's classifications of water types appears here. For the complete classification system, see WAC 222-16-030.

Type 1: All waters, within their ordinary high-water mark, as inventoried as "shorelines of the state."

Type 2: Segments of natural waters which are not Type 1 and have a high fish, wildlife, or human use. These are segments of natural waters and periodically inundated areas of their associated wetlands.

Type 3: Segments of natural waters which are not Type 1 or 2 and have a moderate to slight fish, wildlife, and human use. These are segments of natural waters and periodically inundated areas of their associated wetlands

Type 4: Segments of natural waters which are not Type 1, 2, or 3, and for the purpose of protecting water quality downstream are classified as Type 4 water upstream until the channel width becomes less than 2 feet in width between the ordinary high-water marks. These may be perennial or intermittent.

Type 5: Natural waters which are not Type 1, 2, 3, or 4; including streams with or without well-defined channels, areas of perennial or intermittent seepage, ponds, natural sinks and drainage ways having short periods of spring or storm runoff.

Watershed - The drainage basin contributing water, organic matter, dissolved nutrients, and sediments to a stream or lake.

Watershed administrative unit (WAU) - In Washington, the basic hydrologic unit used for watershed analysis. See WAC 222-22-020 for more information.

Watershed analysis - A systematic procedure for characterizing watershed and ecological processes to meet specific management objectives; provides a basis for resource management planning. In Washington, the assessment of a watershed administrative unit completed under state law.

Wetland - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, such as swamps, bogs, fens, and similar areas.

Wetland typing system - A simplified explanation of Washington's classifications of wetland types appears here. For the complete classification system, see WAC 222-16-035.

Nonforested Wetland - Any wetland or portion thereof that has, or if the trees were mature would have, a crown closure of less than 30 percent. There are two types of nonforested wetlands: Type A and Type B. A Type A Wetland is (1) greater than 0.5 acre in size; (2) associated with at least 0.5 acre of ponded or standing open water; or, (3) are bogs and fens greater than 0.25 acre. A Type B Wetland classification is all other nonforested wetlands greater than 0.25 acre.

Forested Wetland - Any wetland or portion thereof that has, or if the trees were mature would have, a crown closure of 30 percent or more.

Wildlife Code of Washington - Title 77 RCW (Revised Code of Washington).

Wind buffer - As defined for the HCP's west-side planning units, the outer buffer of the riparian management zone that maintains the ecological integrity of the riparian buffer by reducing windthrow.

Windthrow - Trees blown down by wind; also called blowdown.

Yarding - Transporting logs from the point of felling to a collecting point or landing.

Young forest - A forest that is 50-80 years old.

Young forest marginal habitat - As defined by the Washington Forest Practices Board Spotted Owl Advisory Group, younger forest that provides some of the characteristics spotted owls need for roosting, foraging, and dispersal. This habitat type corresponds to the low to mid-range of the former Type C designation.

The following references were used in developing the glossary:

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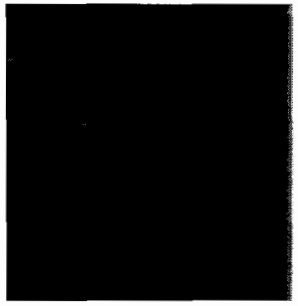
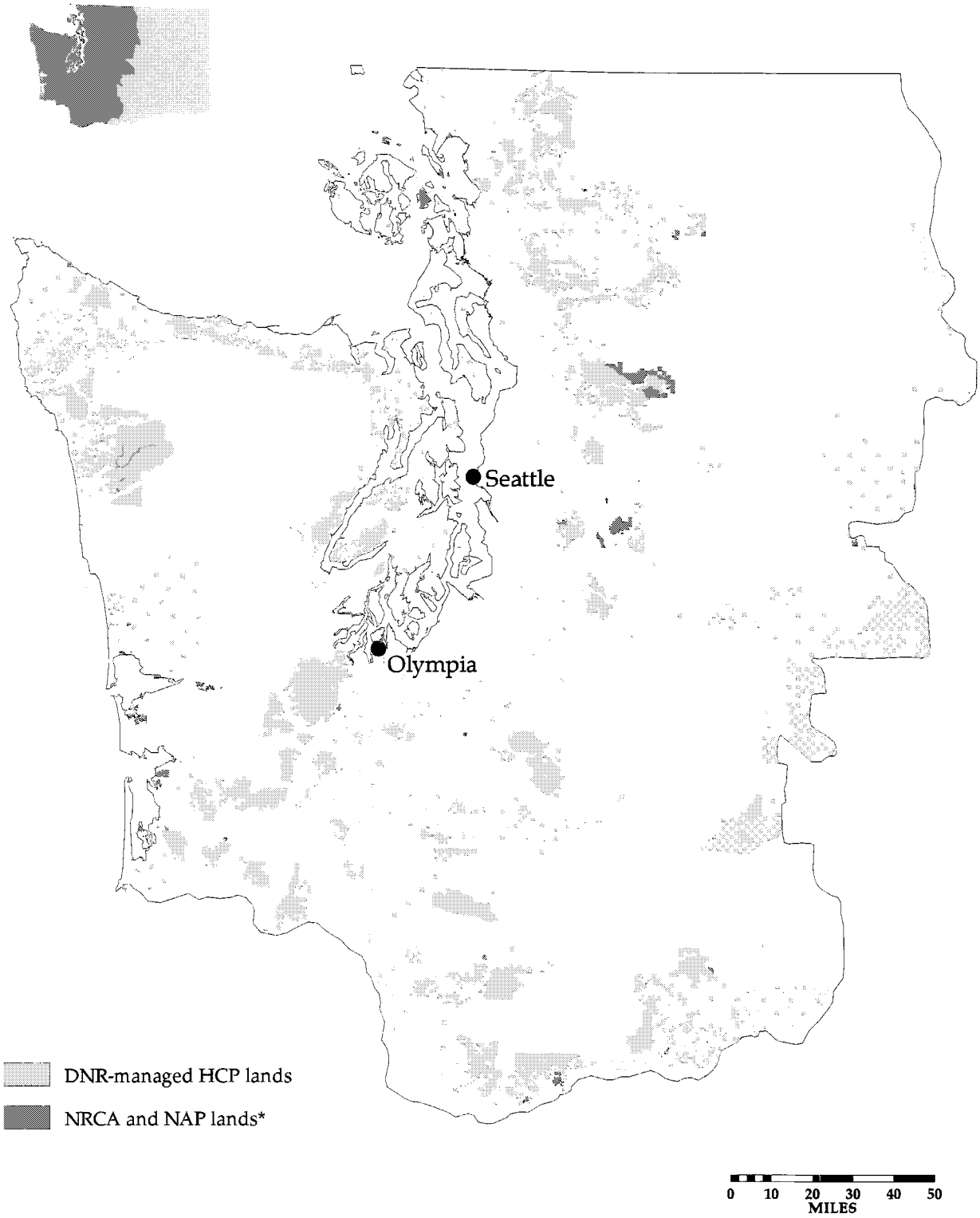


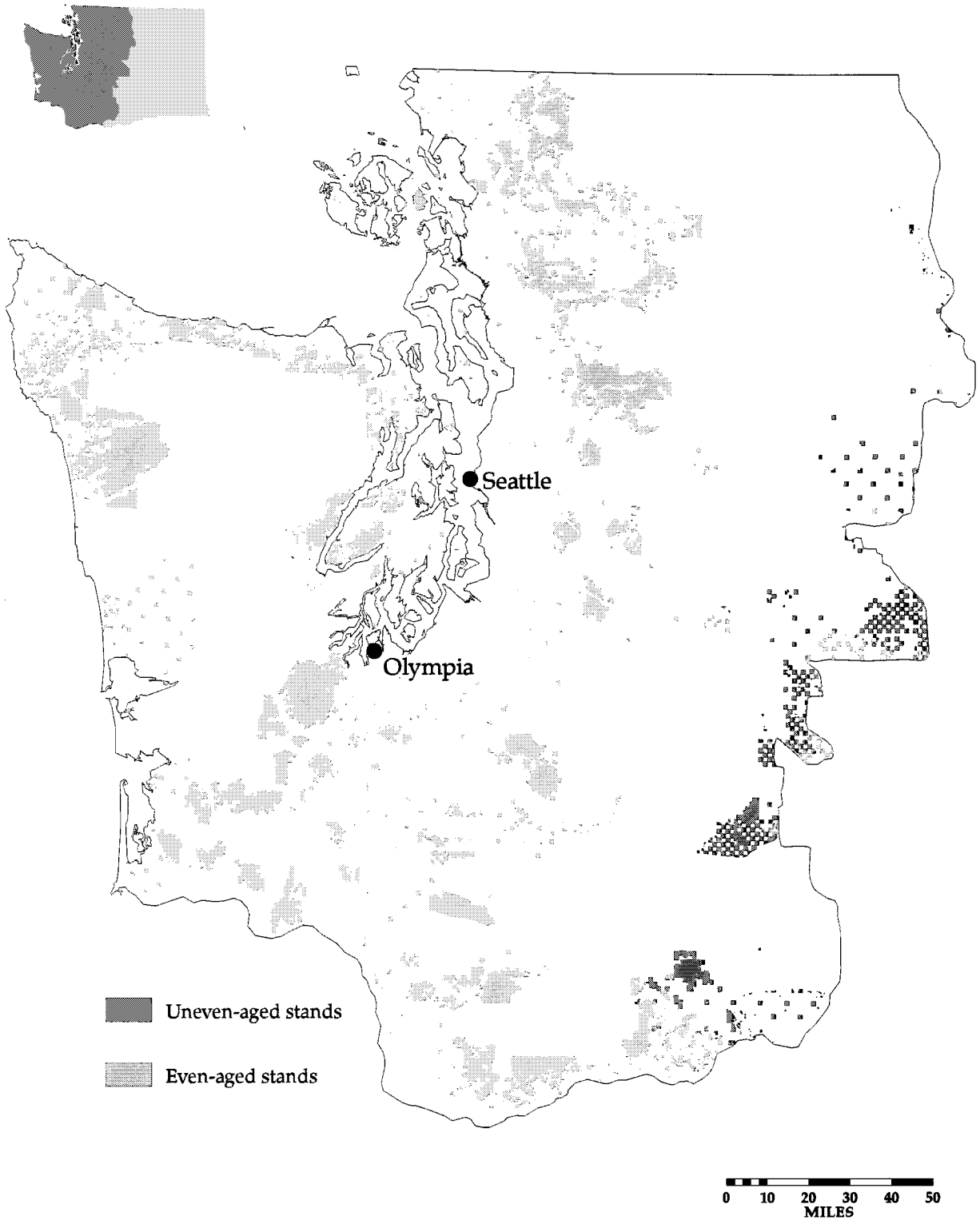
Maps

Map I.1: DNR-managed lands covered by the Habitat Conservation Plan



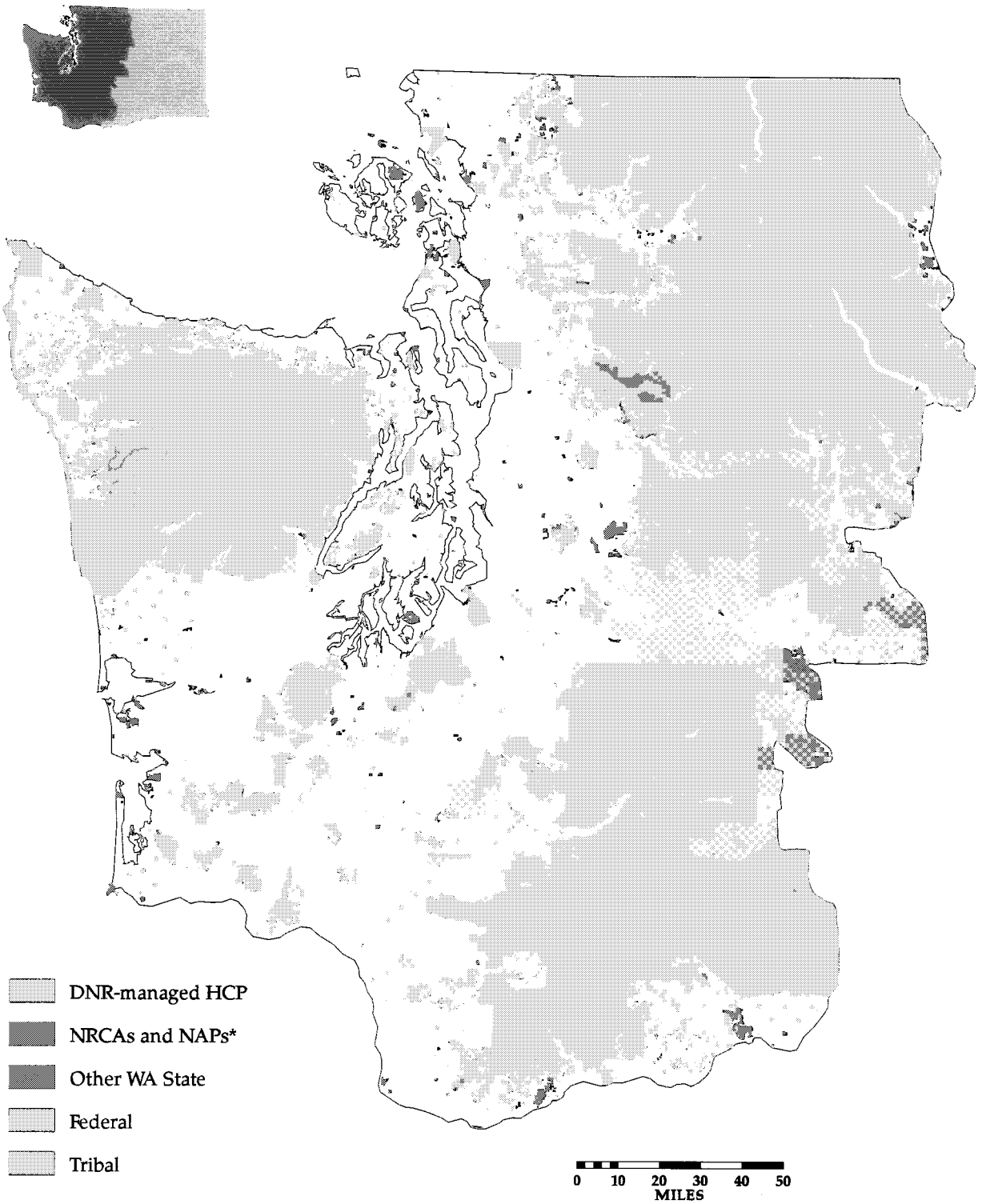
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.2: Location of uneven-aged and even-aged stands on DNR-managed lands covered by the HCP



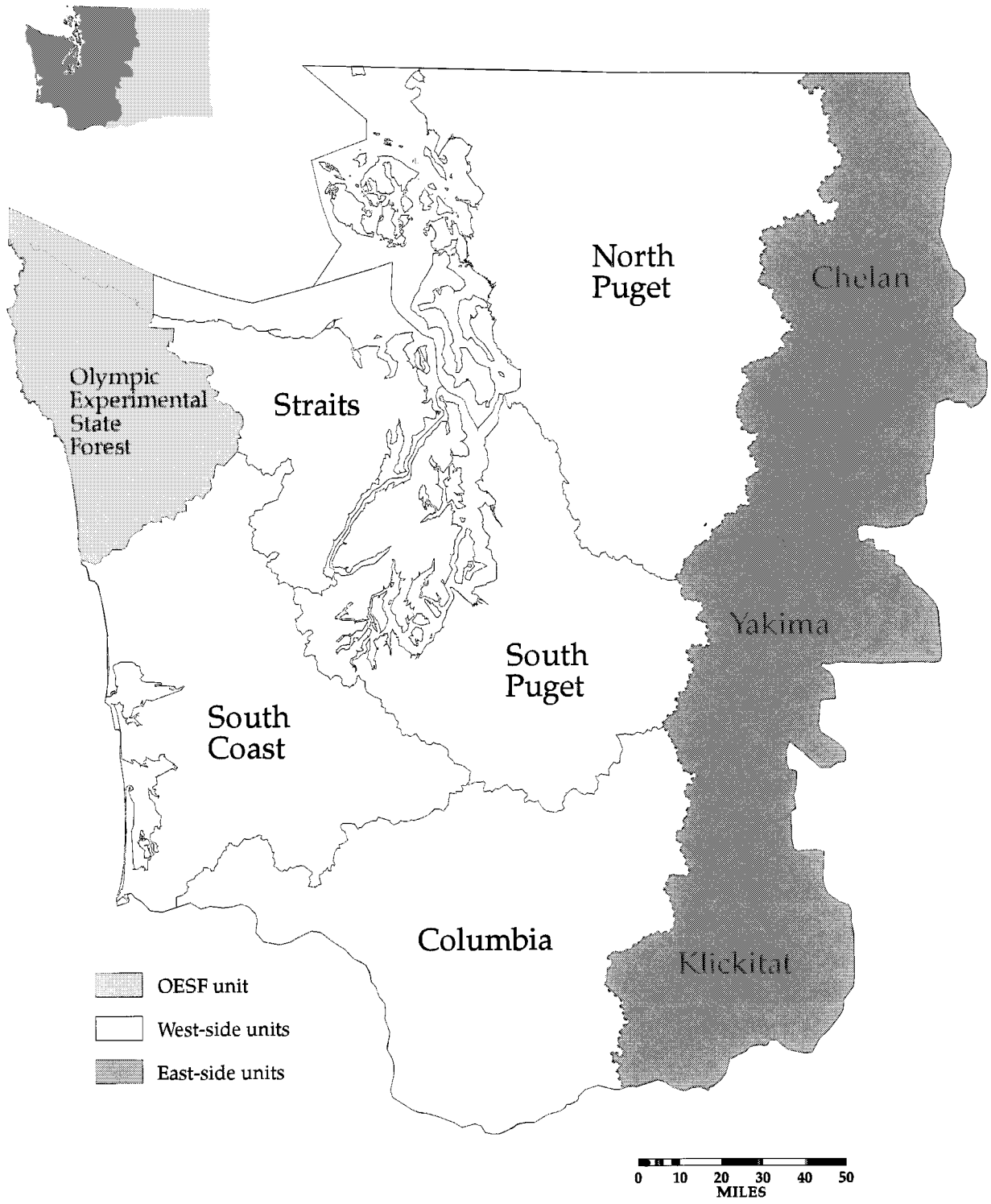
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.

Map I.3: DNR-managed lands and adjacent ownerships in the area covered by the HCP



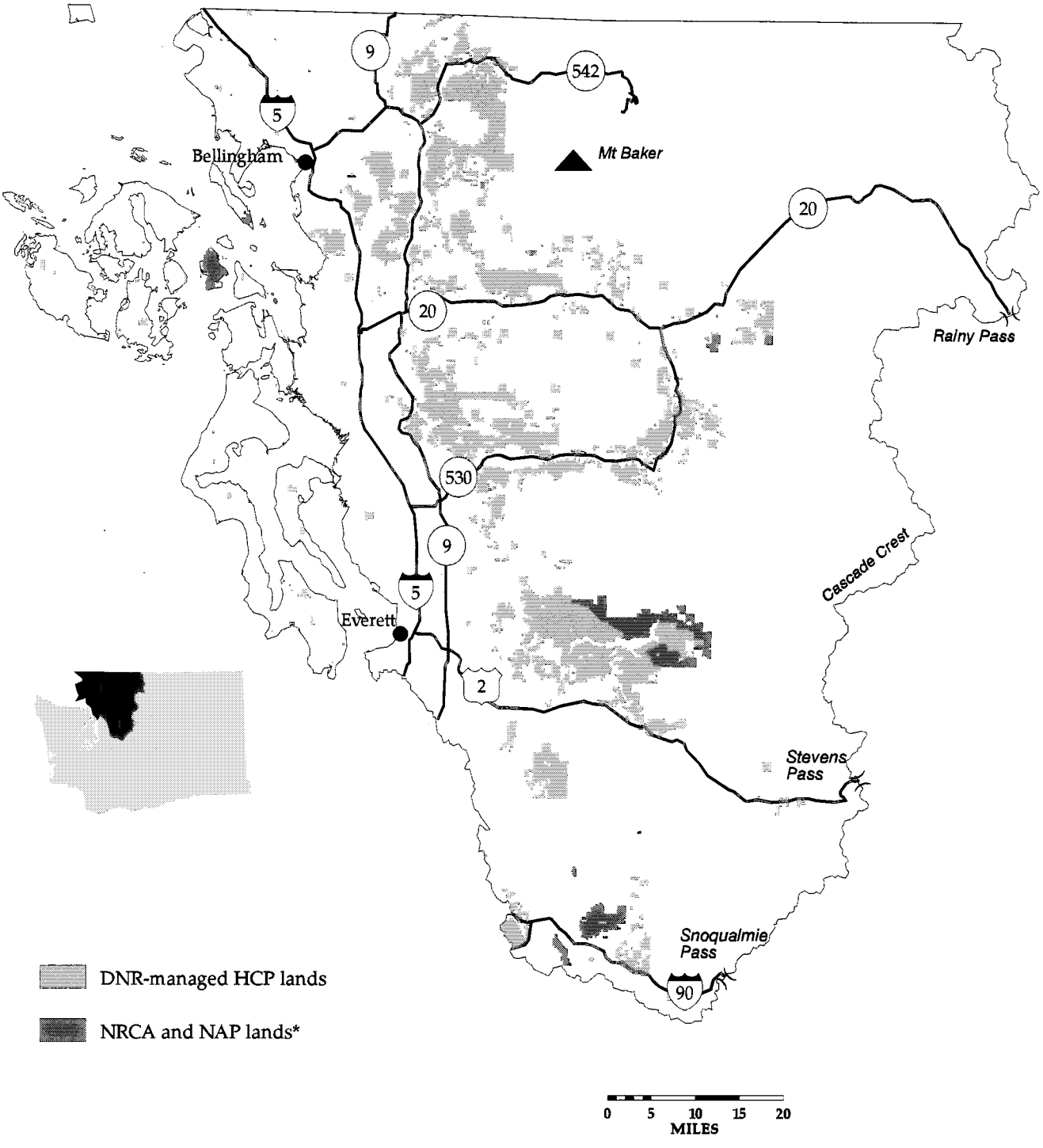
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.4: HCP planning units



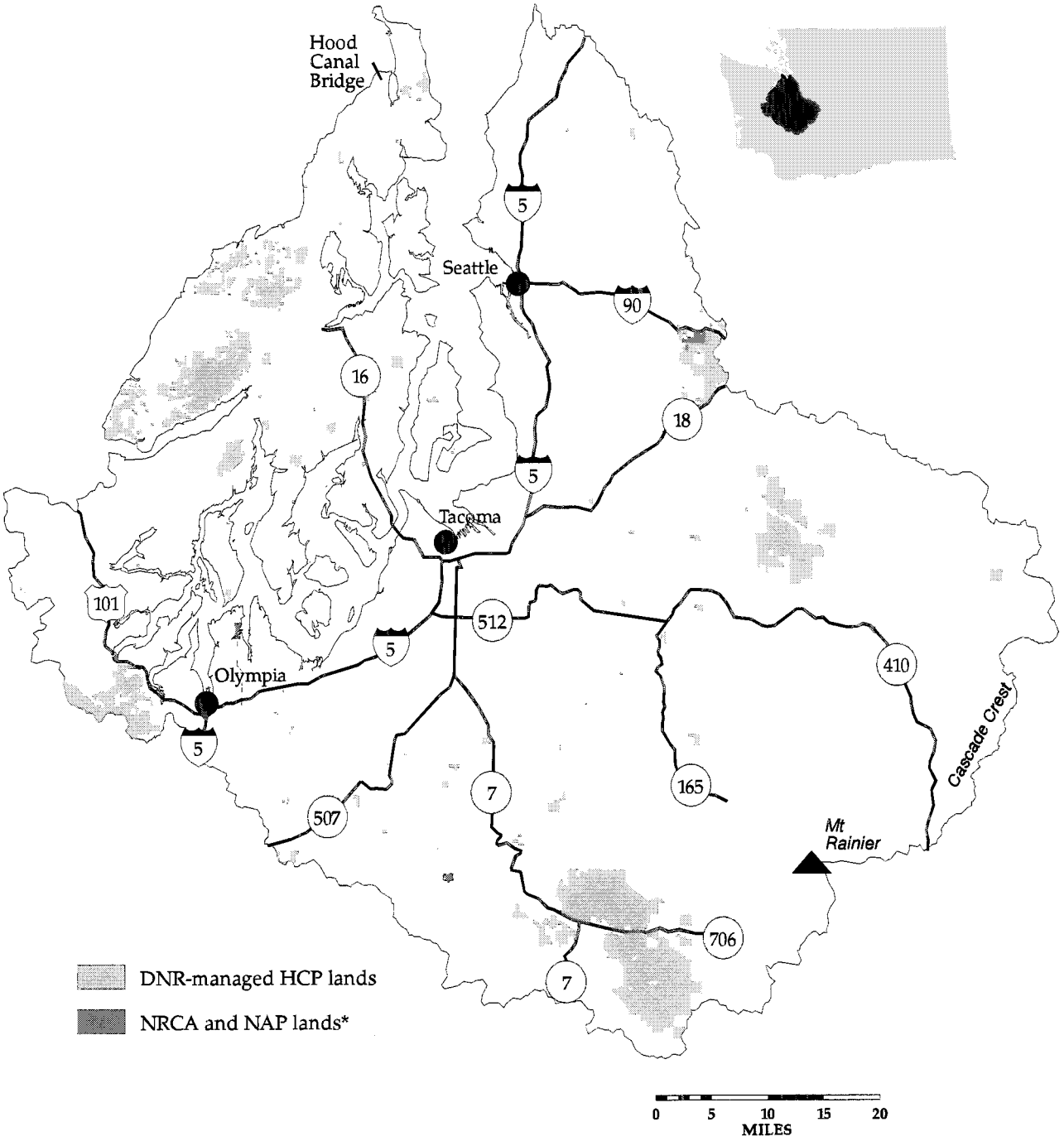
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.

Map I.5: North Puget Planning Unit



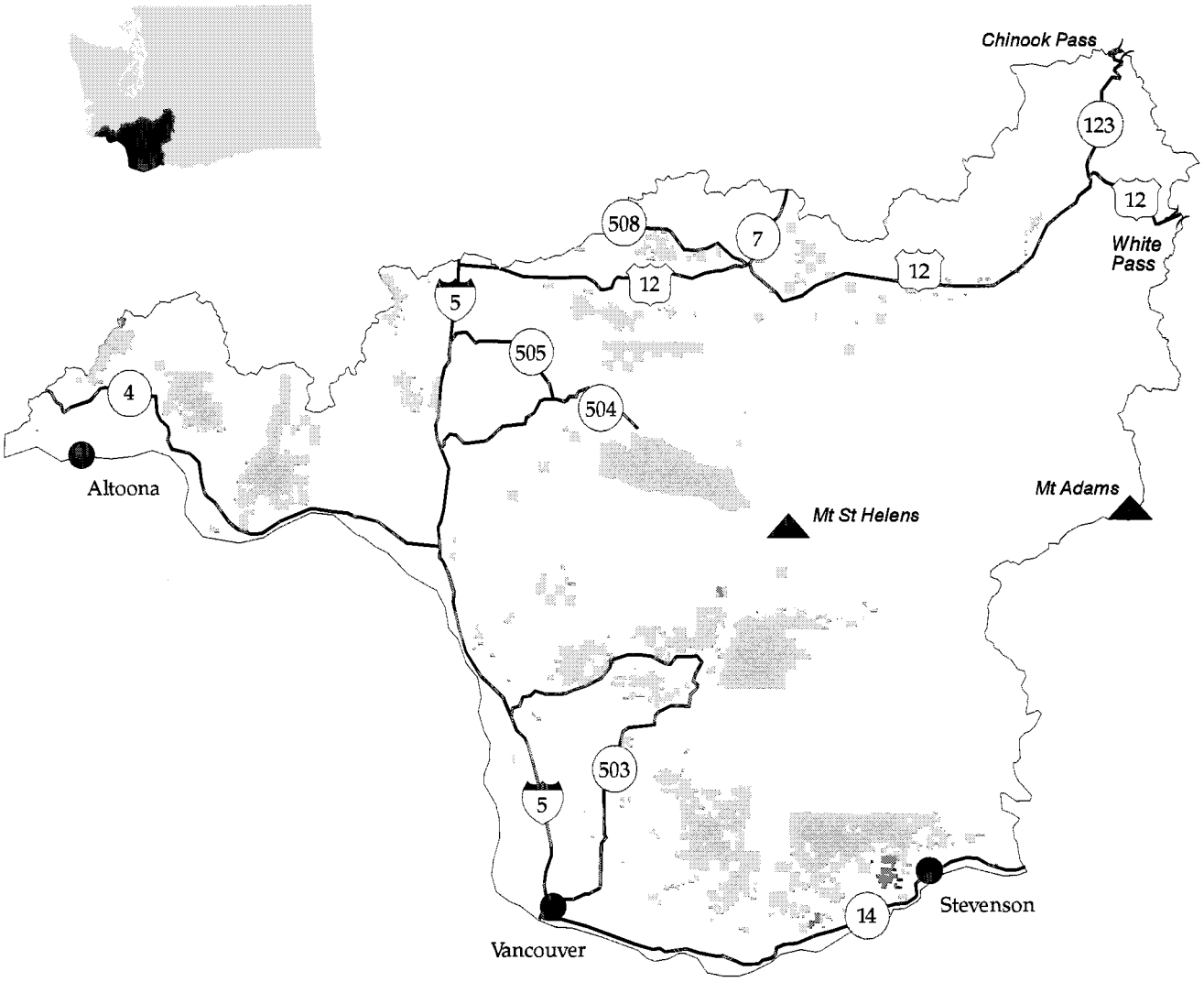
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.6: South Puget Planning Unit



RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.7: Columbia Planning Unit



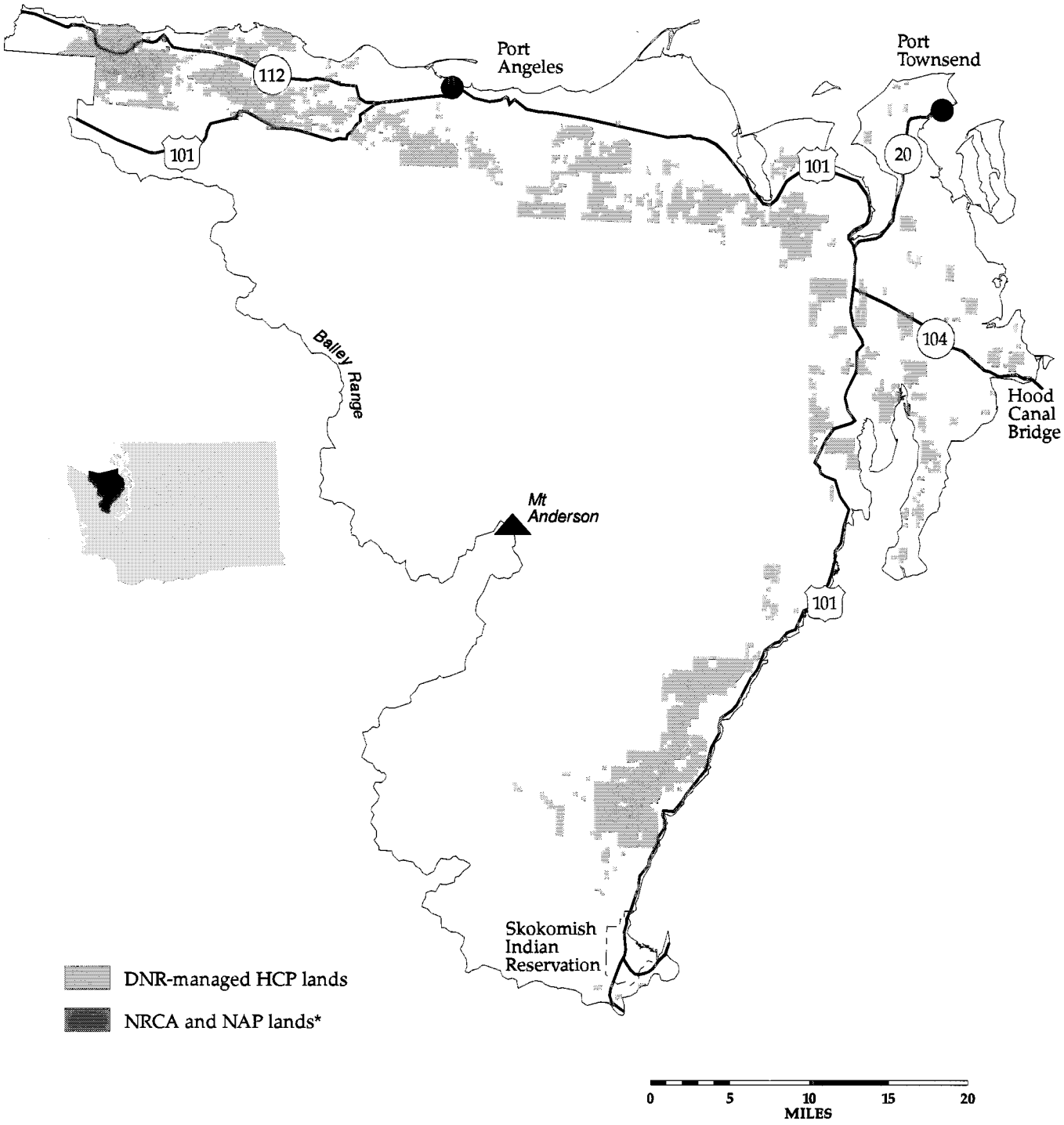
DNR-managed HCP lands

NRCA and NAP lands*

0 5 10 15 20
MILES

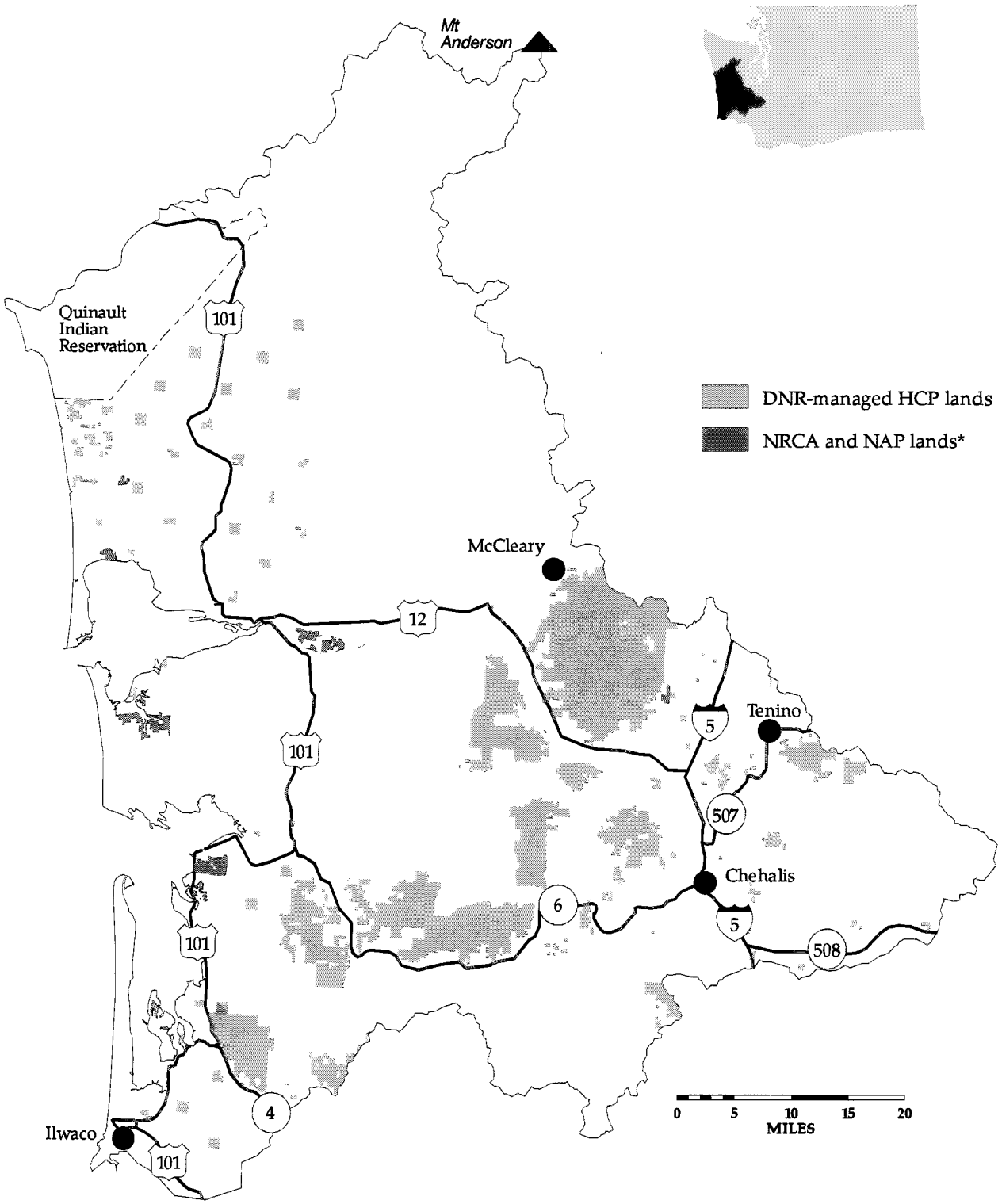
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.8: Straits Planning Unit



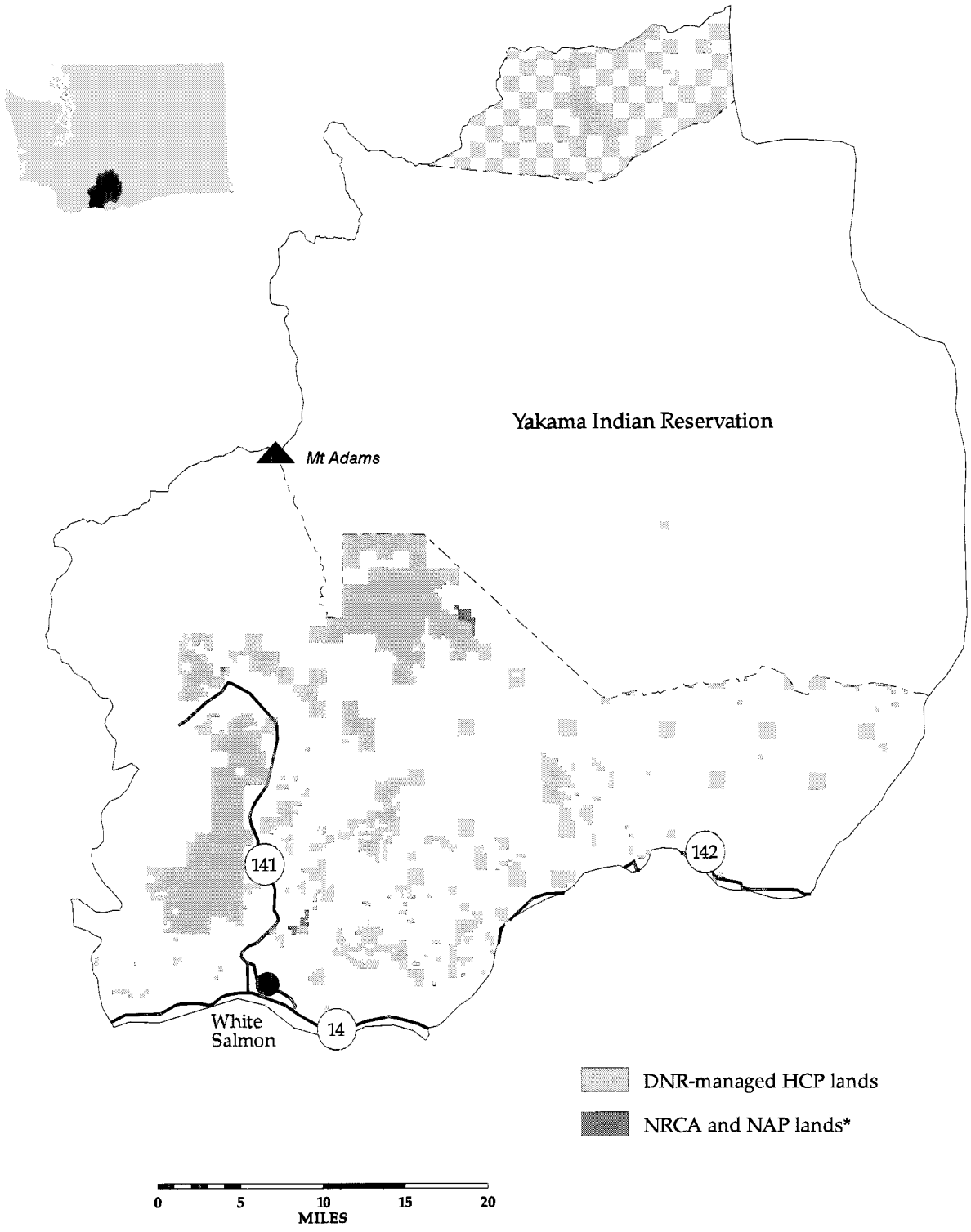
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.9: South Coast Planning Unit



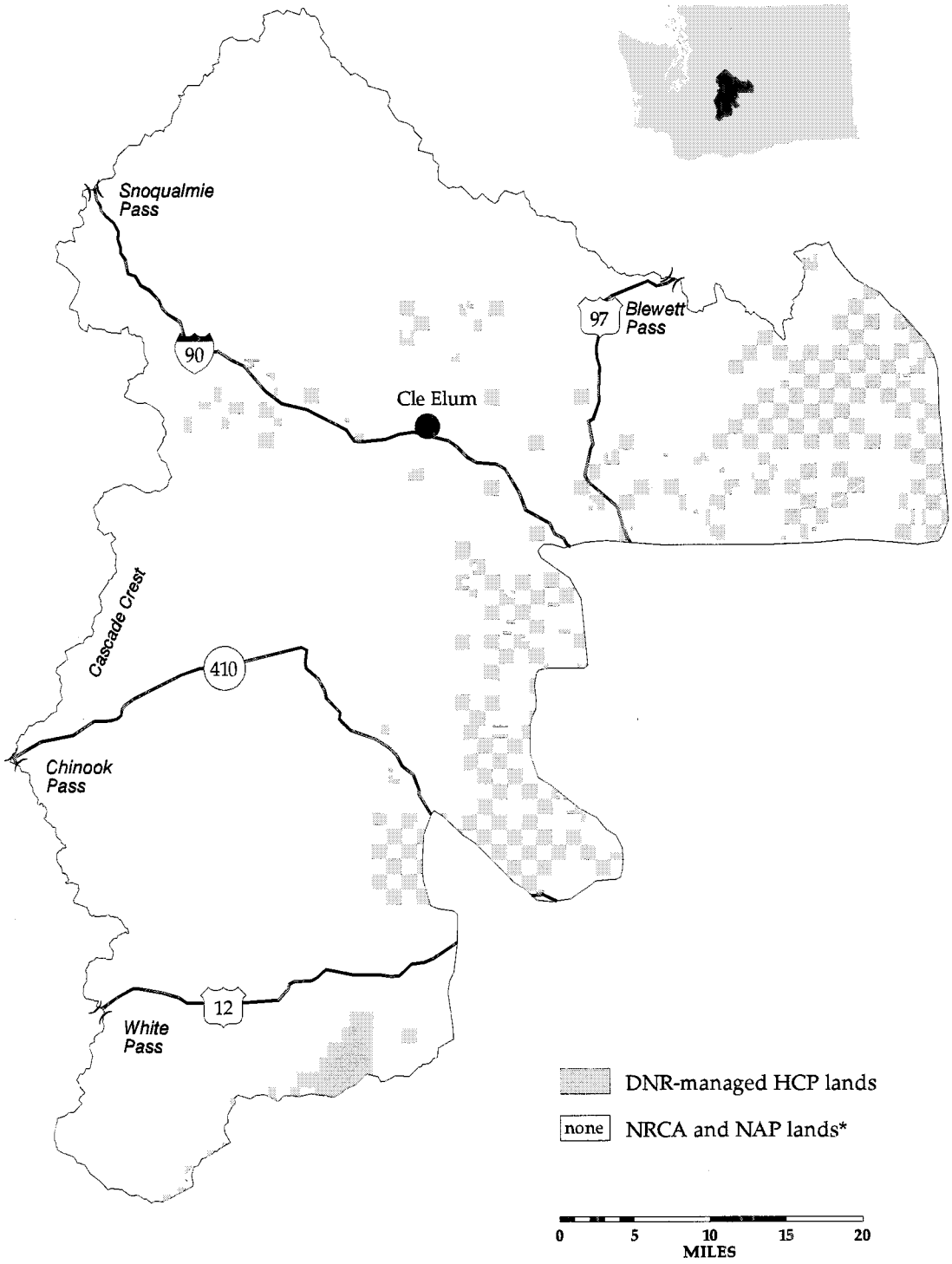
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.10: Klickitat Planning Unit



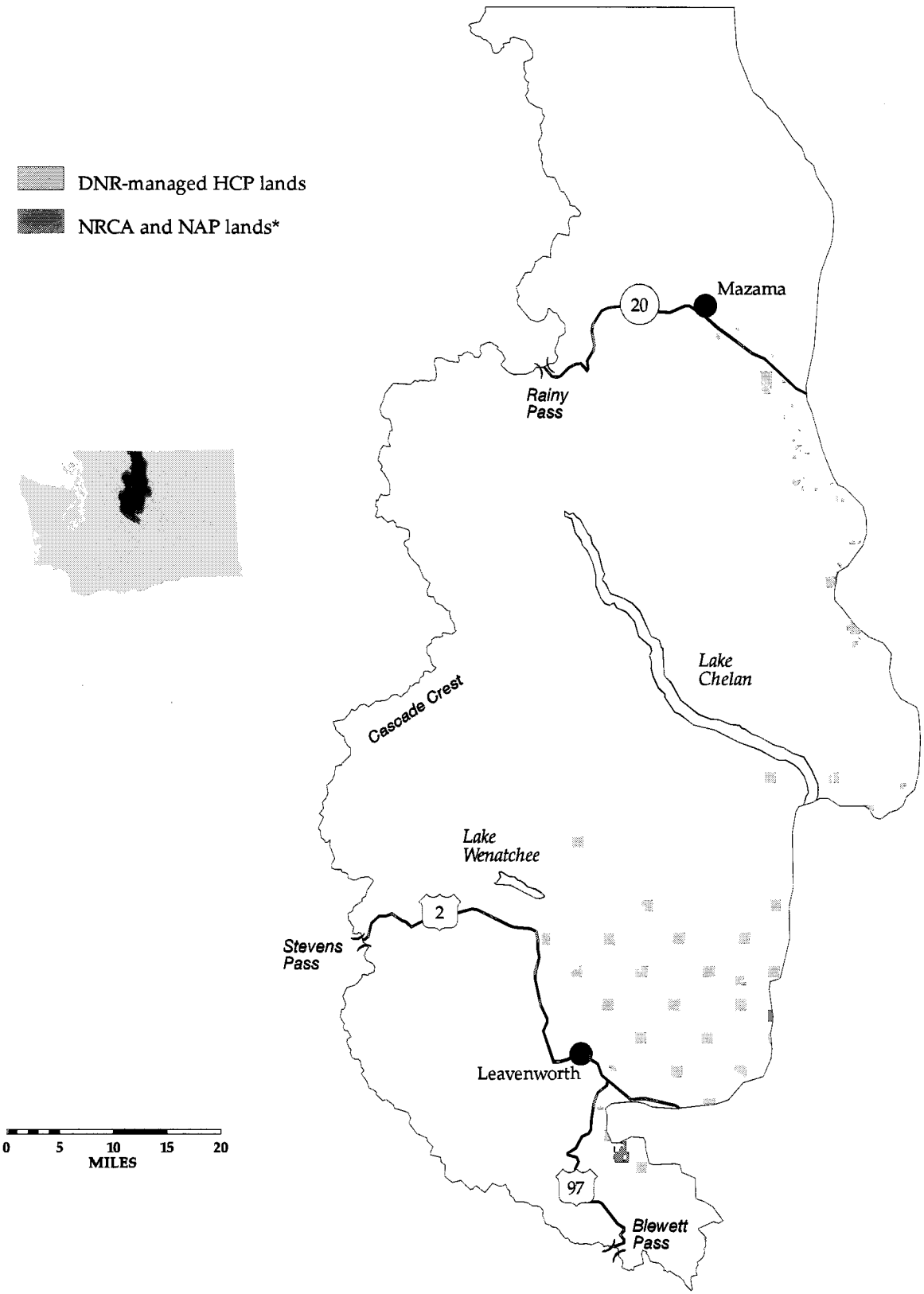
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.11: Yakima Planning Unit



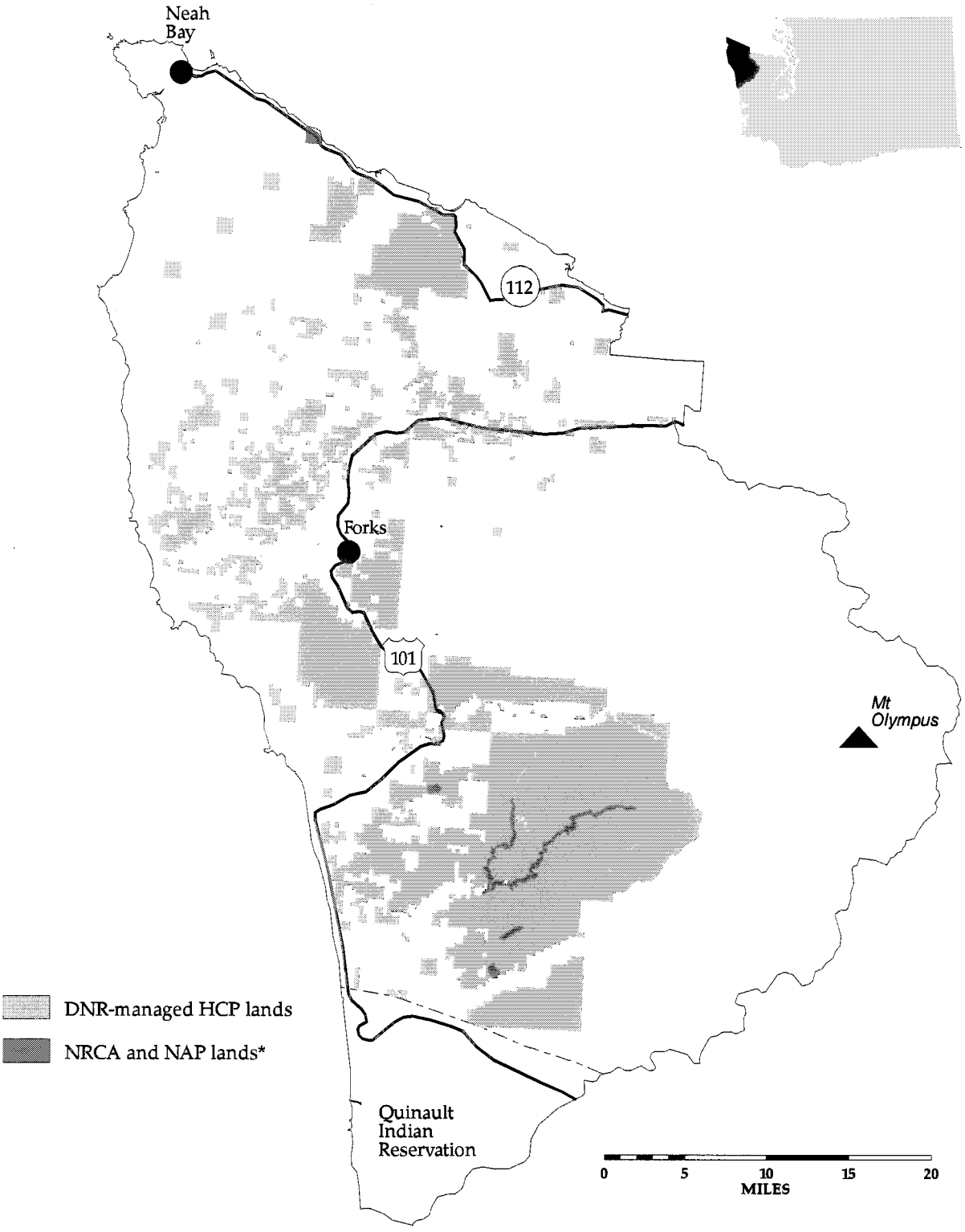
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.12: Chelan Planning Unit



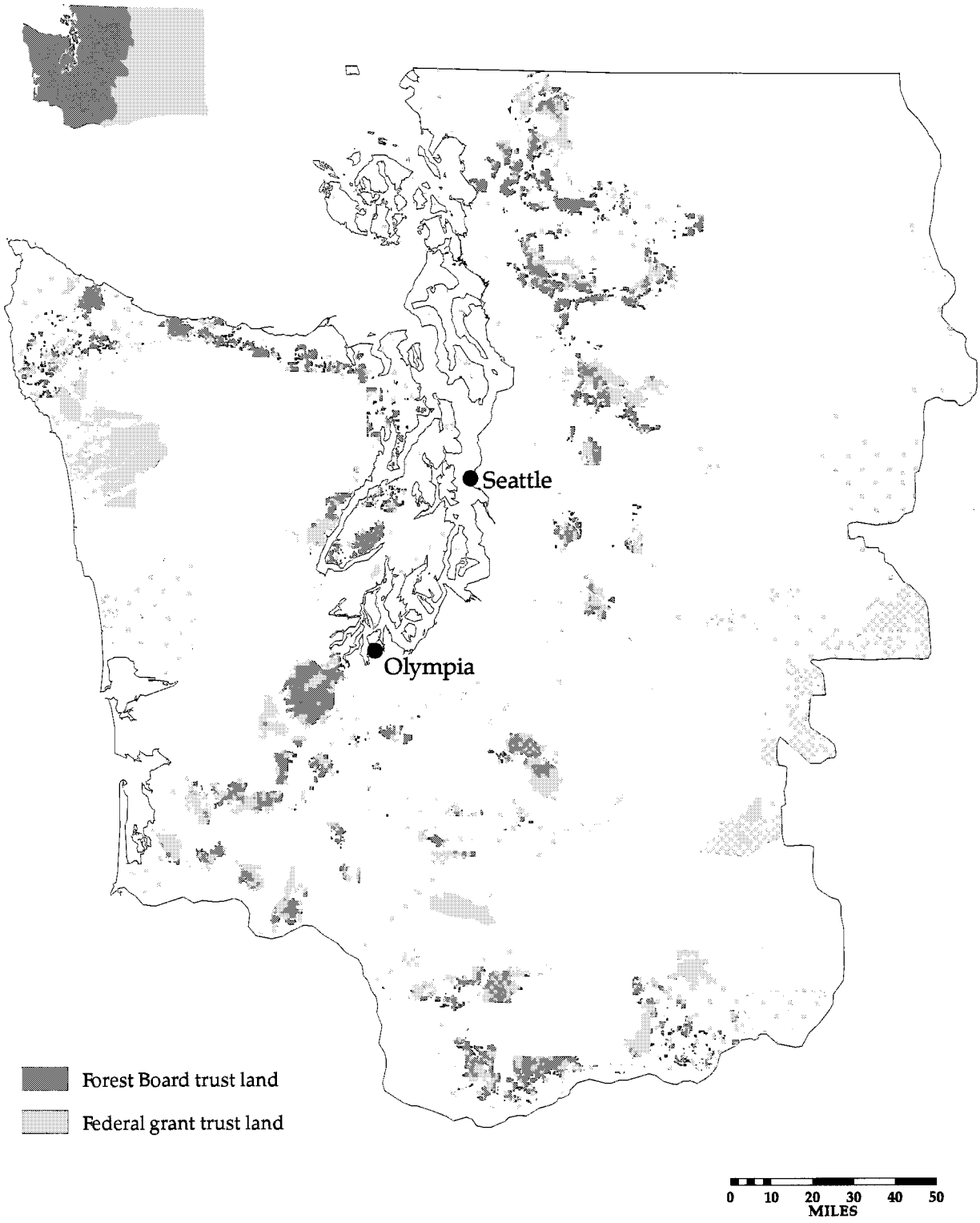
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map I.13: The Olympic Experimental State Forest Planning Unit



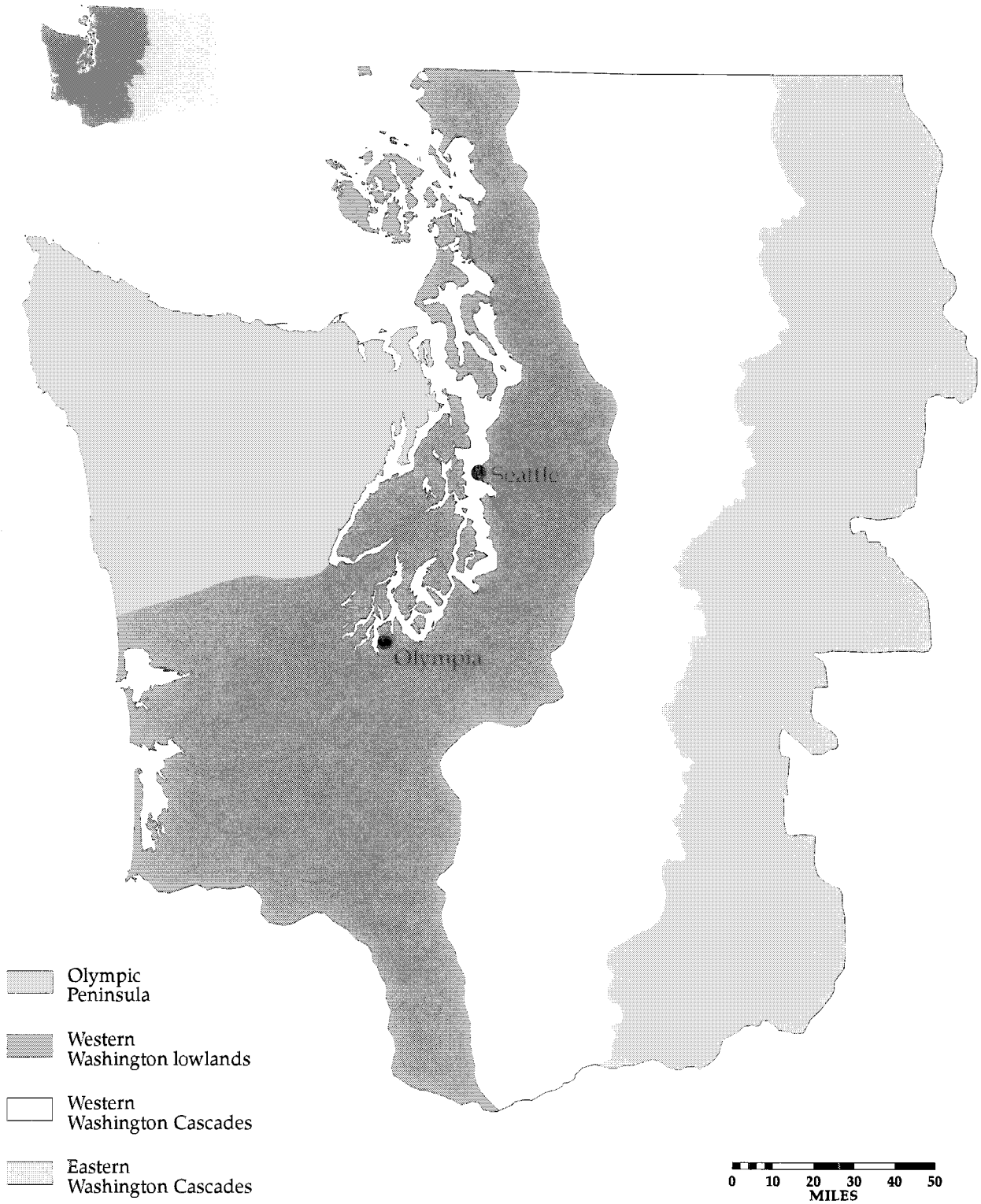
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map II.1: DNR-managed trust lands in the area covered by the HCP



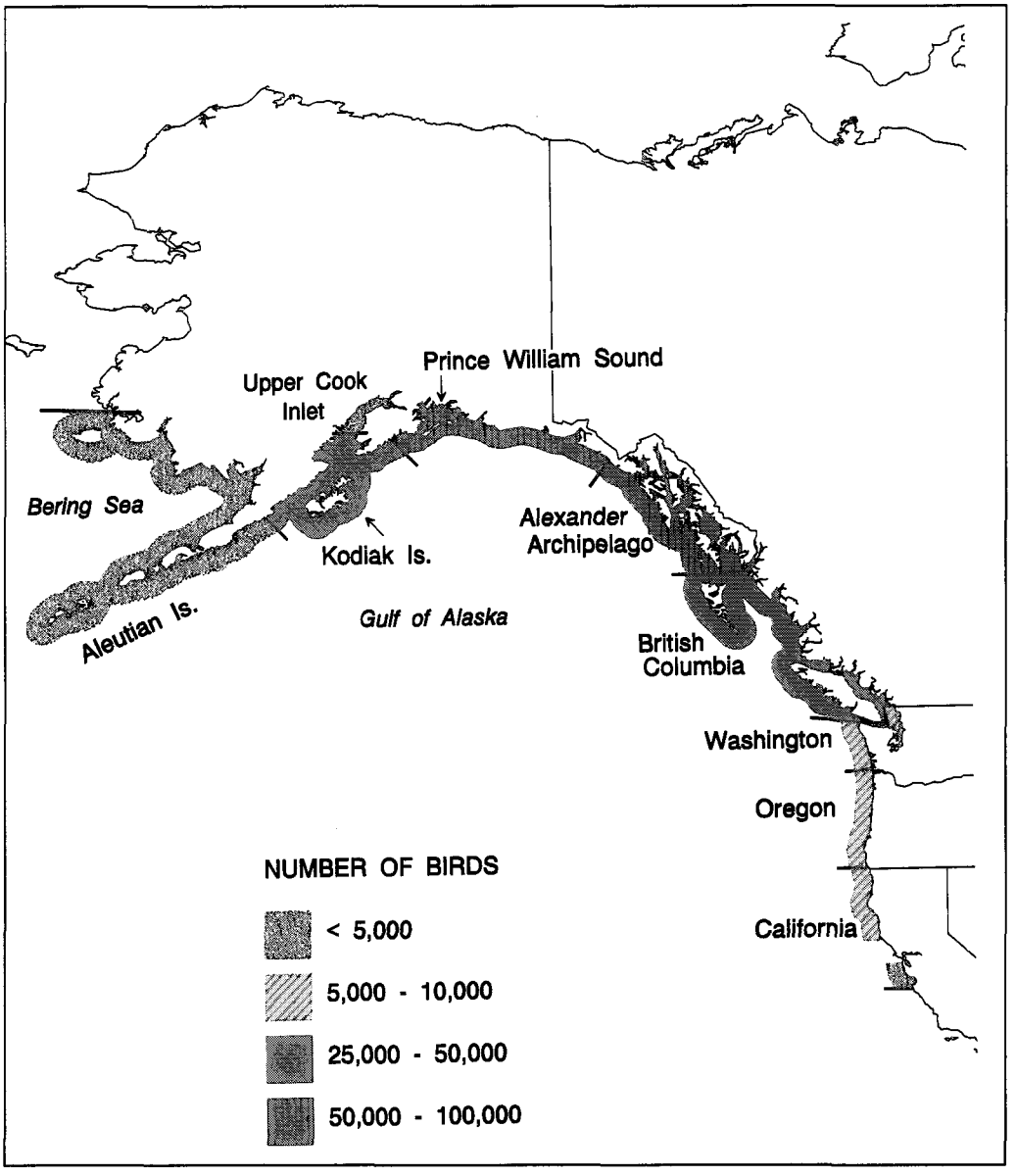
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.

Map III.1: Physiographic provinces of the northern spotted owl



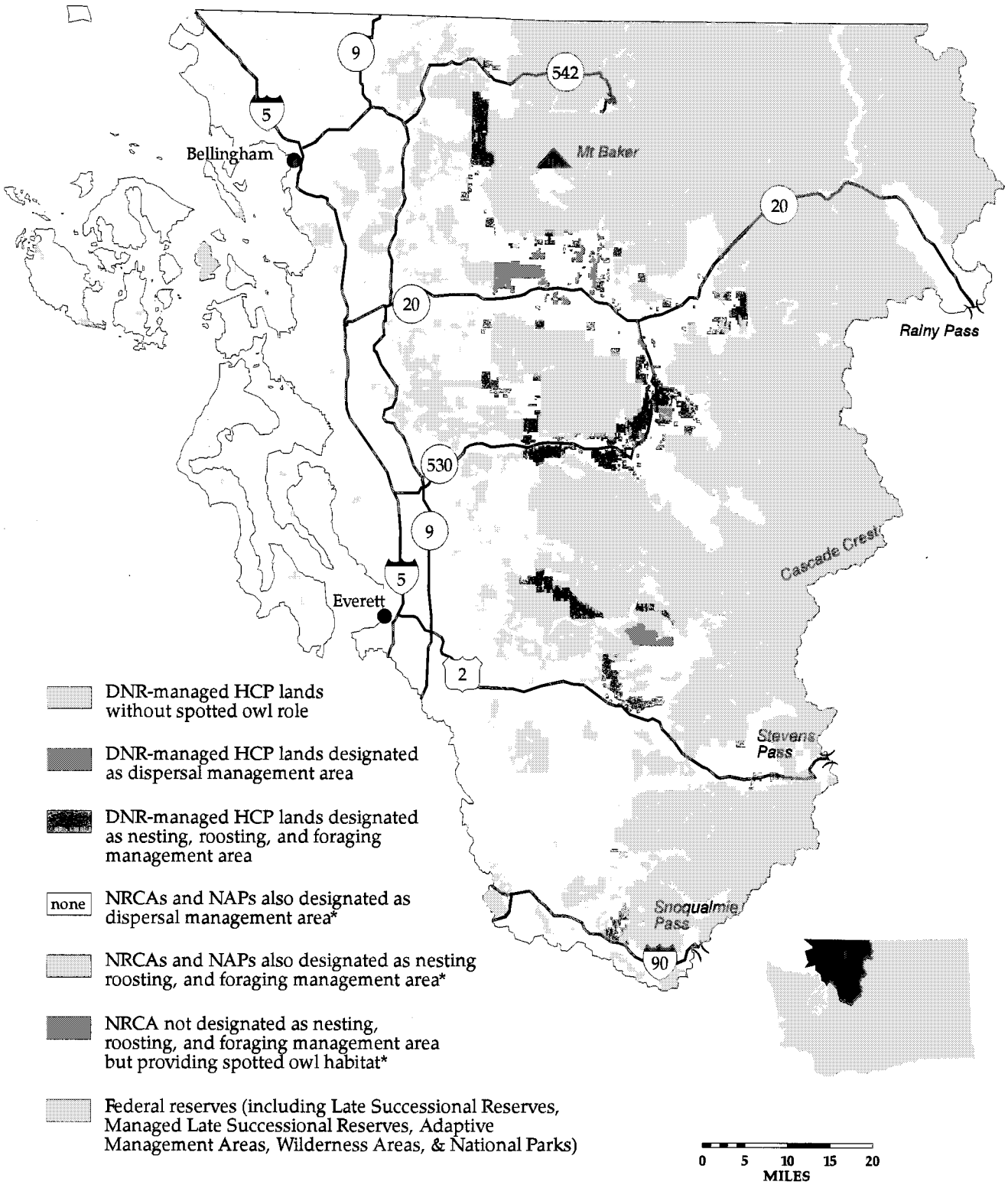
RMS 8/97 (Source: USDI 1992a p. 32)
This map is for planning purposes only.

Map III.2: Range of the marbled murrelet and population sizes along the Pacific coast



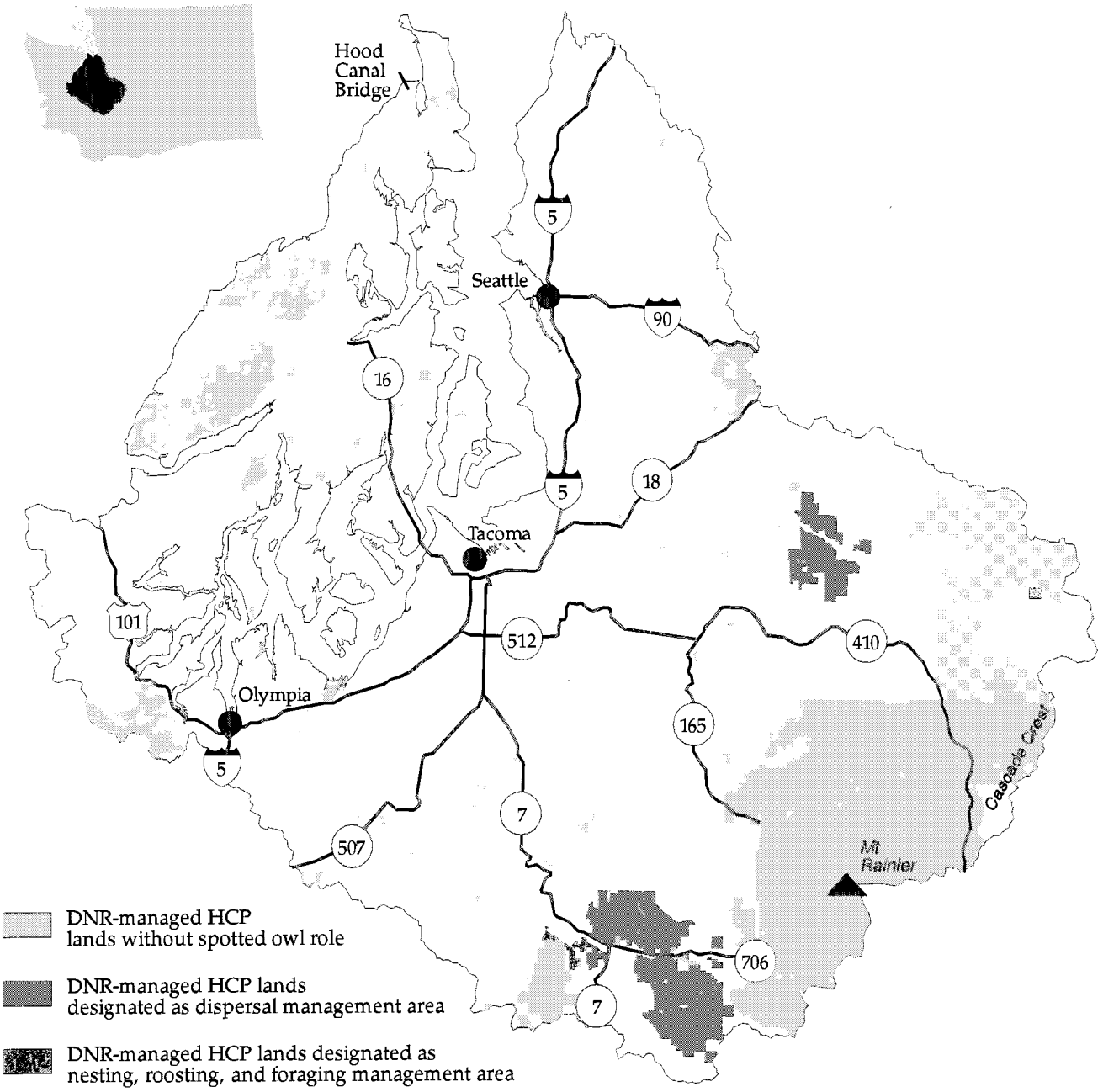
RMS 8/97 (Source: Reproduced from Ralph et al. 1995 p. 52)
This map is for planning purposes only.

Map IV.1: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the North Puget Planning Unit



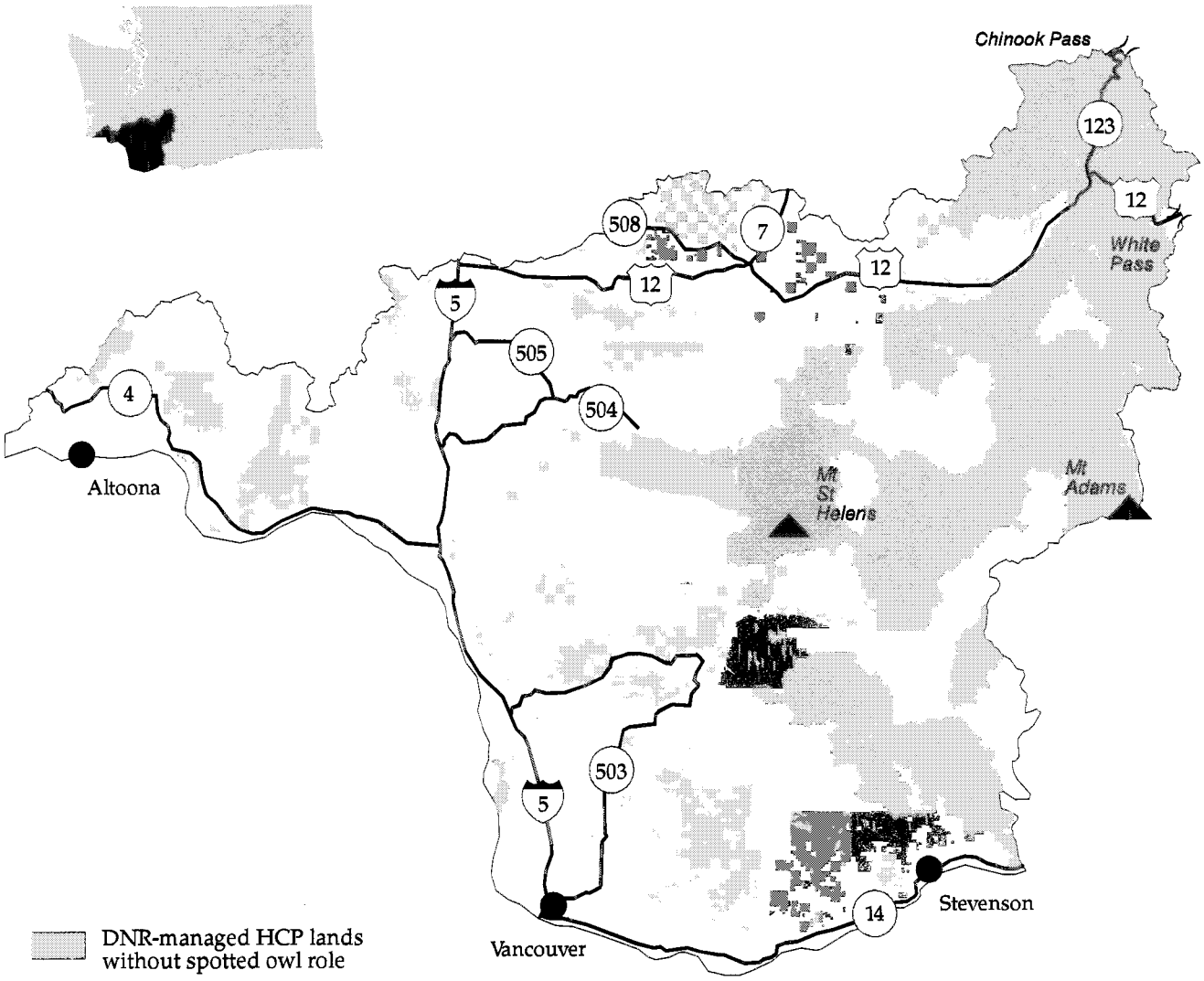
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map IV.2: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the South Puget Planning Unit



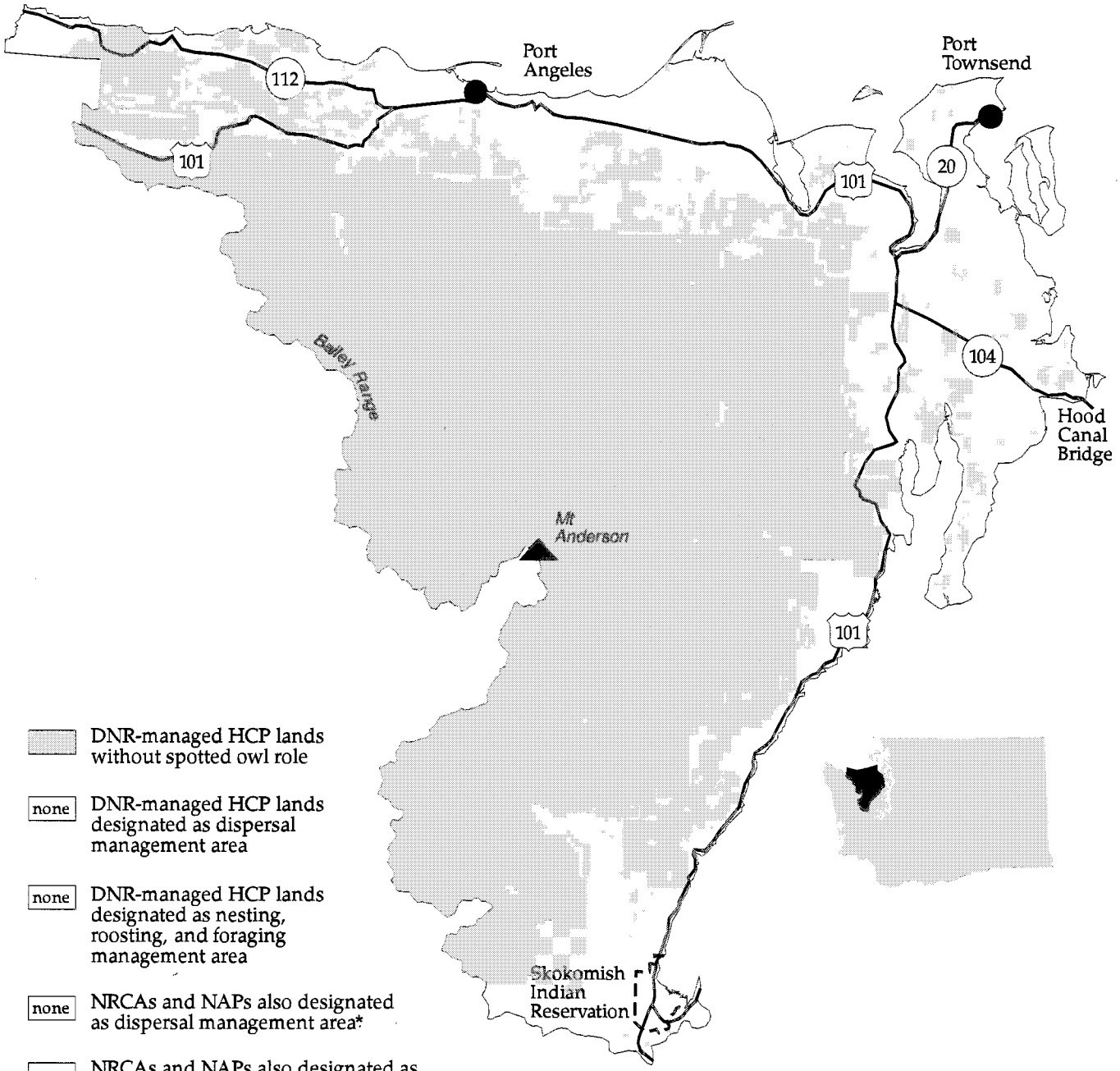
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves: See section in Chapter I titled Land Covered by the HCP.

Map IV.3: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the Columbia Planning Unit



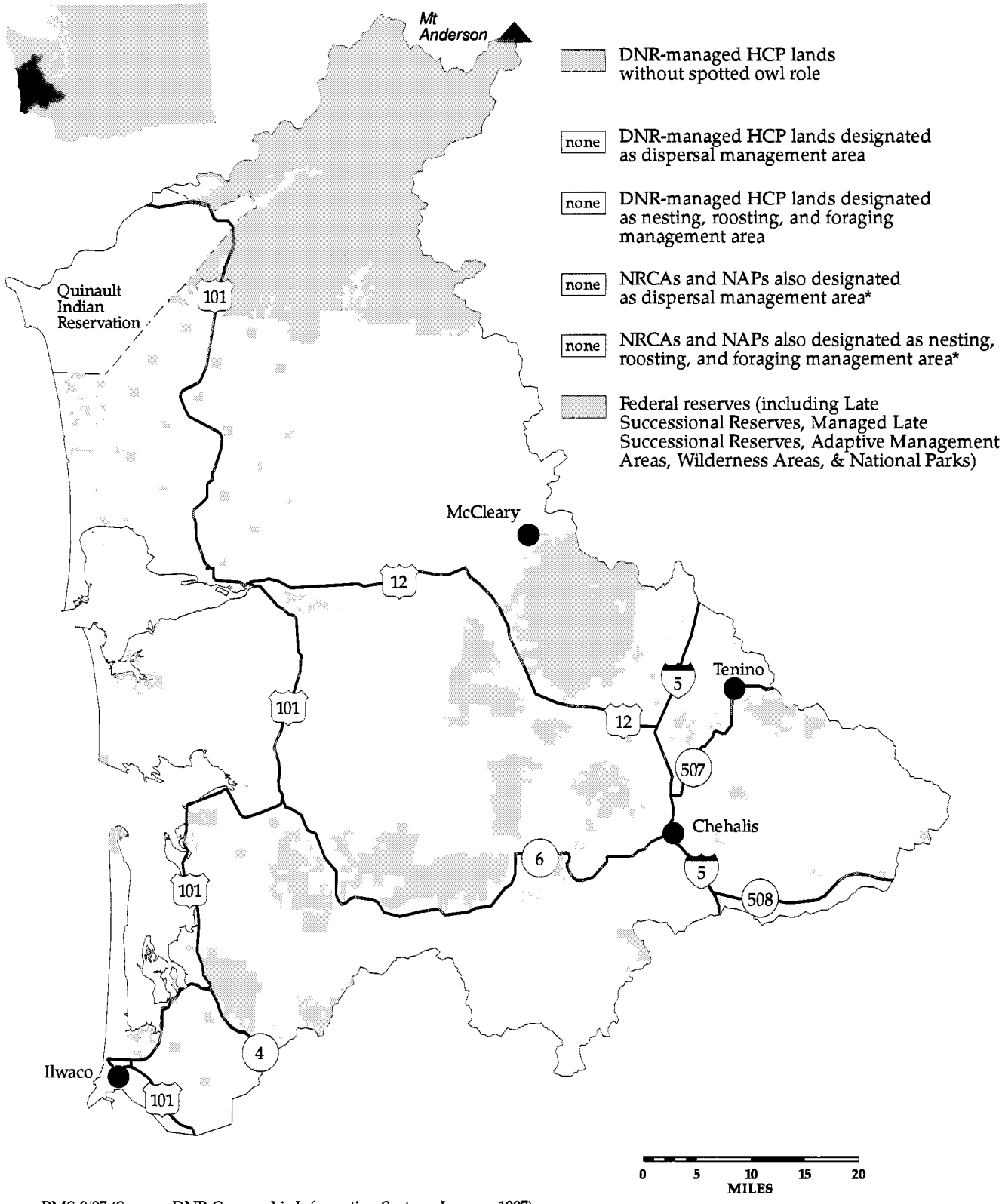
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves: See section in Chapter I titled Land Covered by the HCP.

Map IV.4: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the Straits Planning Unit



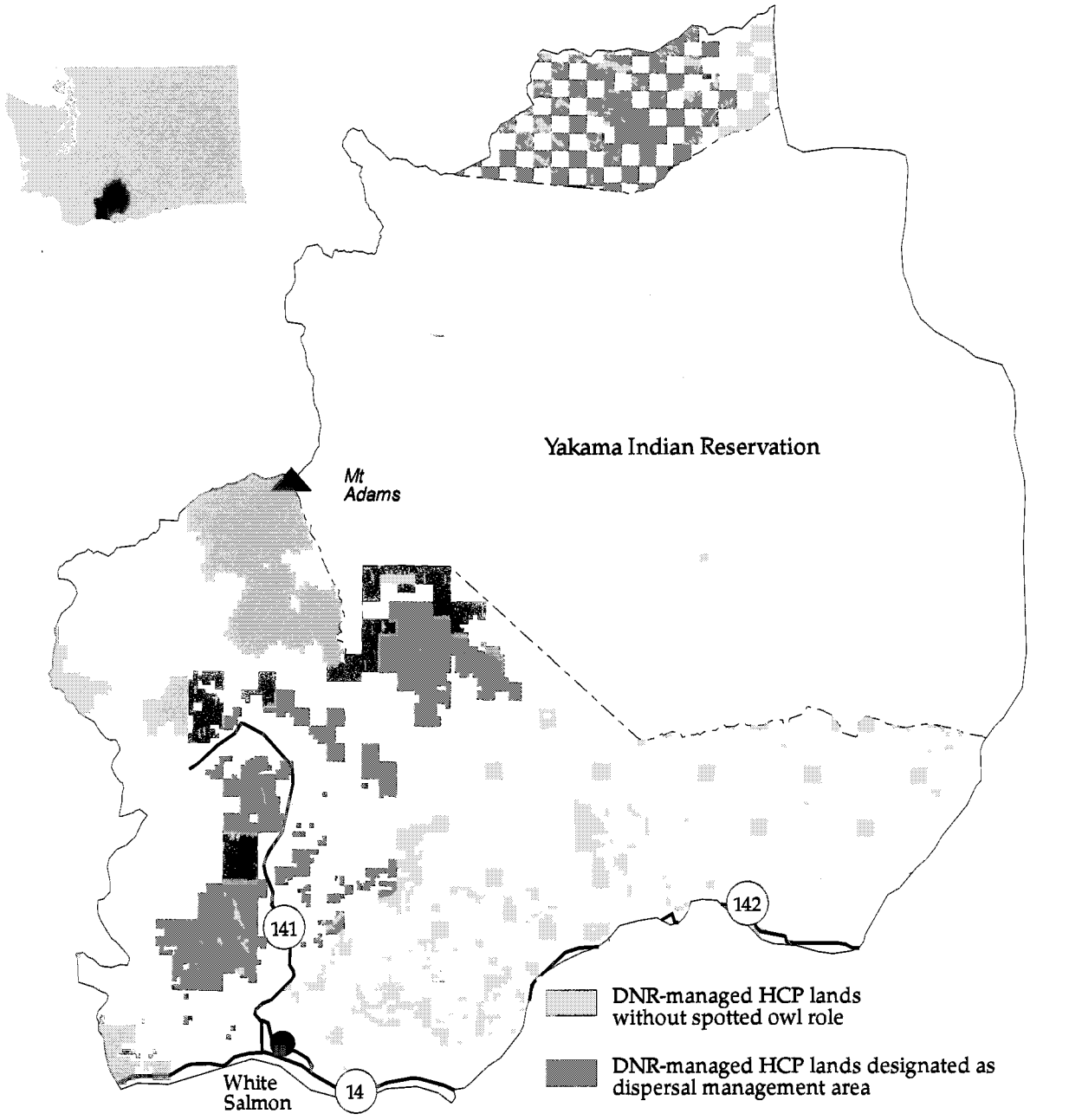
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves:
See section in Chapter I titled Land Covered by the HCP.

Map IV.5: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the South Coast Planning Unit



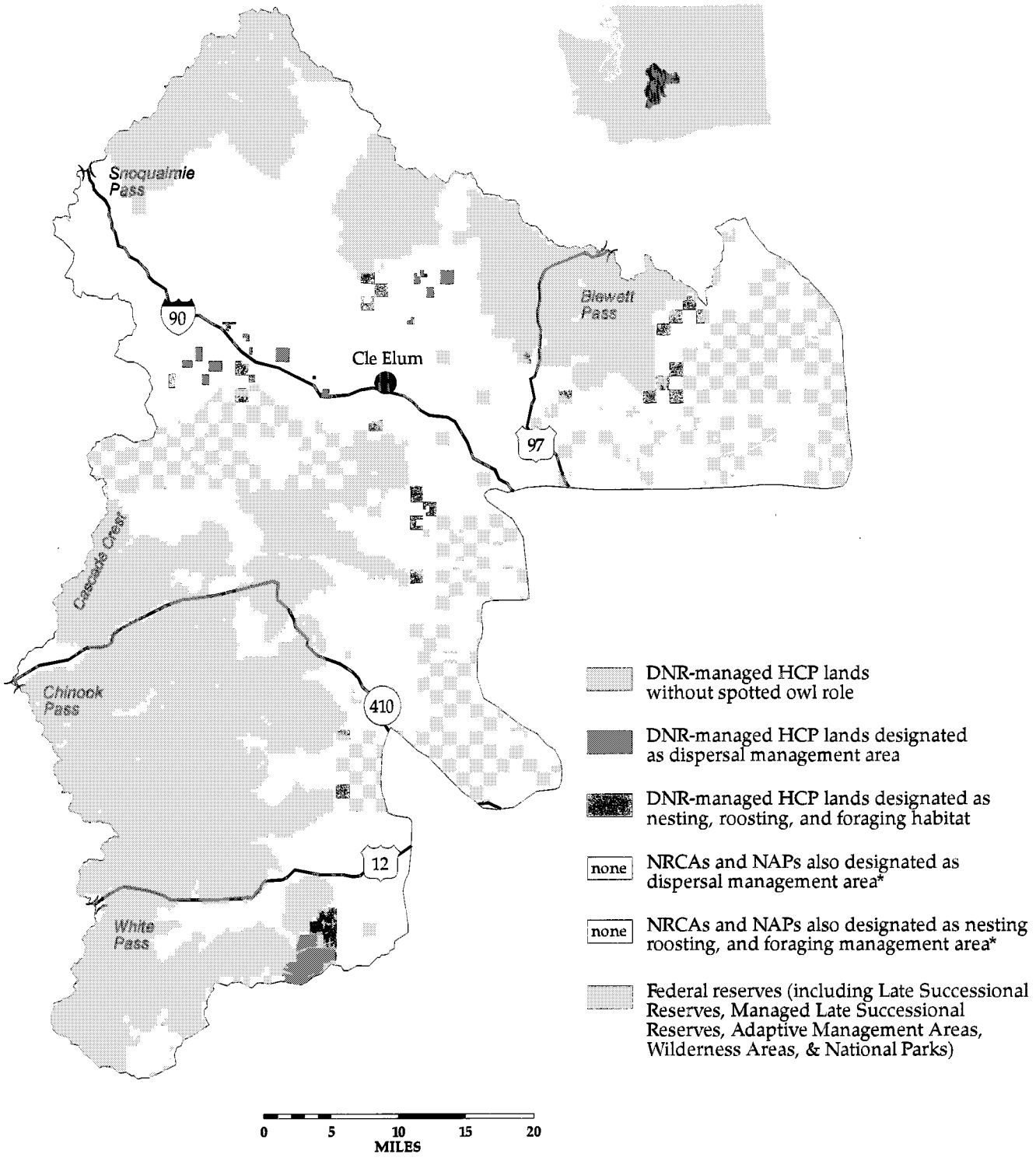
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves: See section in Chapter I titled Land Covered by the HCP.

Map IV.6: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the Klickitat Planning Unit



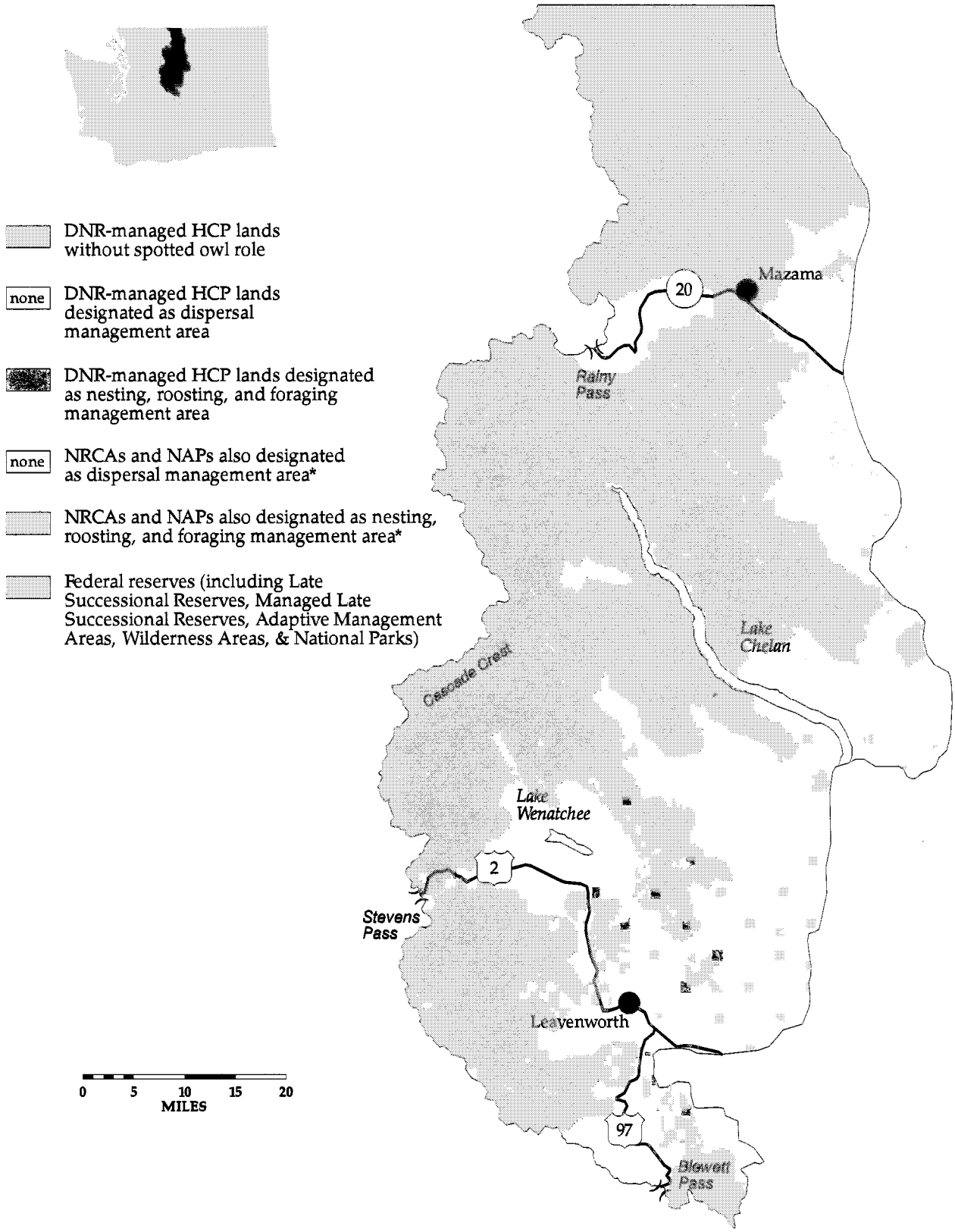
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves: See section in Chapter I titled Land Covered by the HCP.

Map IV.7: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the Yakima Planning Unit



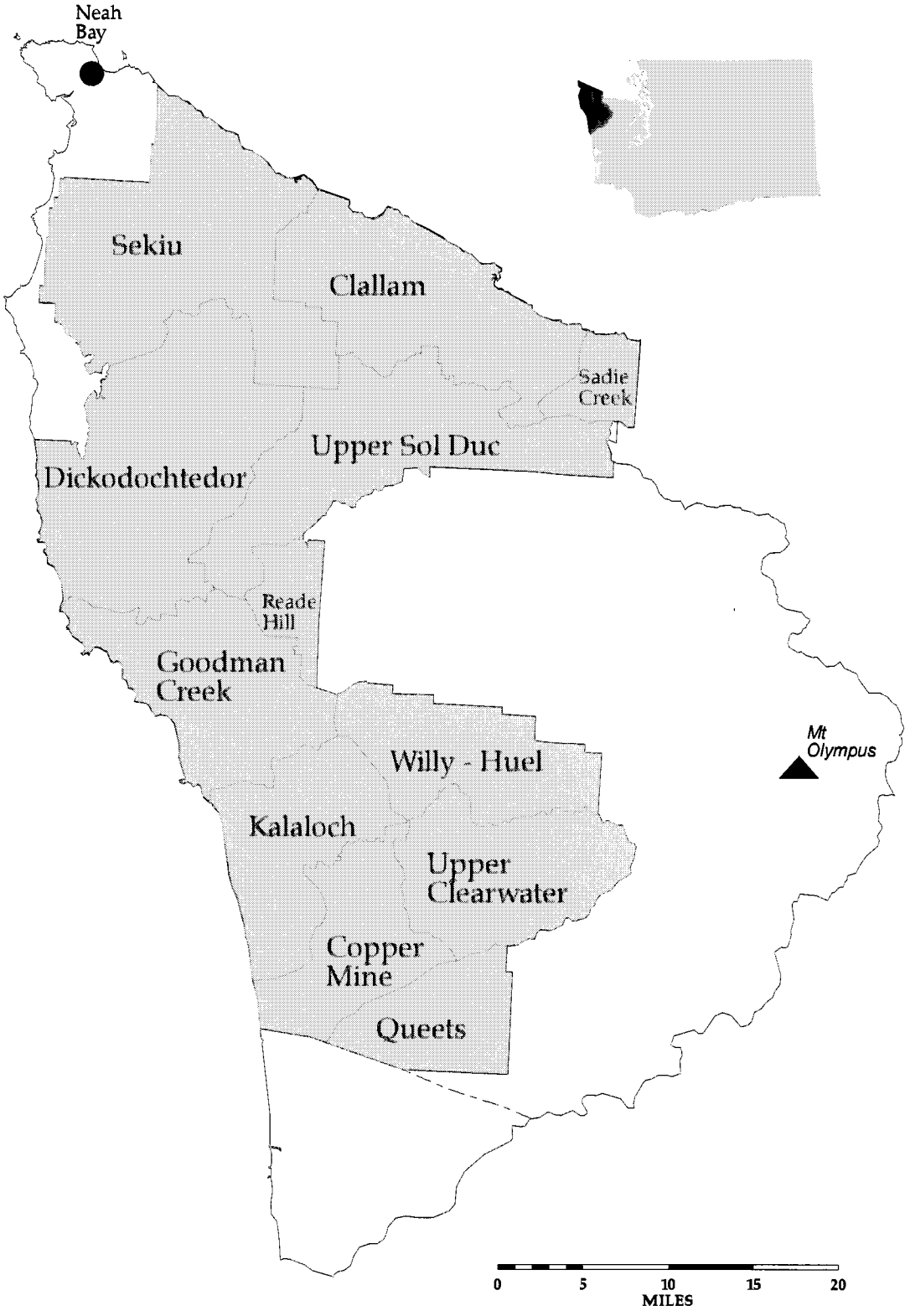
RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves: See section in Chapter I titled Land Covered by the HCP.

Map IV.8: Role of DNR-managed lands in providing mitigation for the northern spotted owl in the Chelan Planning Unit



RMS 8/97 (Source: DNR Geographic Information System, January 1997)
This map is for planning purposes only.
*Natural Resources Conservation Areas and Natural Area Preserves: See section in Chapter I titled Land Covered by the HCP.

Map IV.9: Landscape planning units in the Olympic Experimental State Forest



RMS 8/97 (Source: DNR Geographic Information System, January 1997)
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